

Heart Failure- II

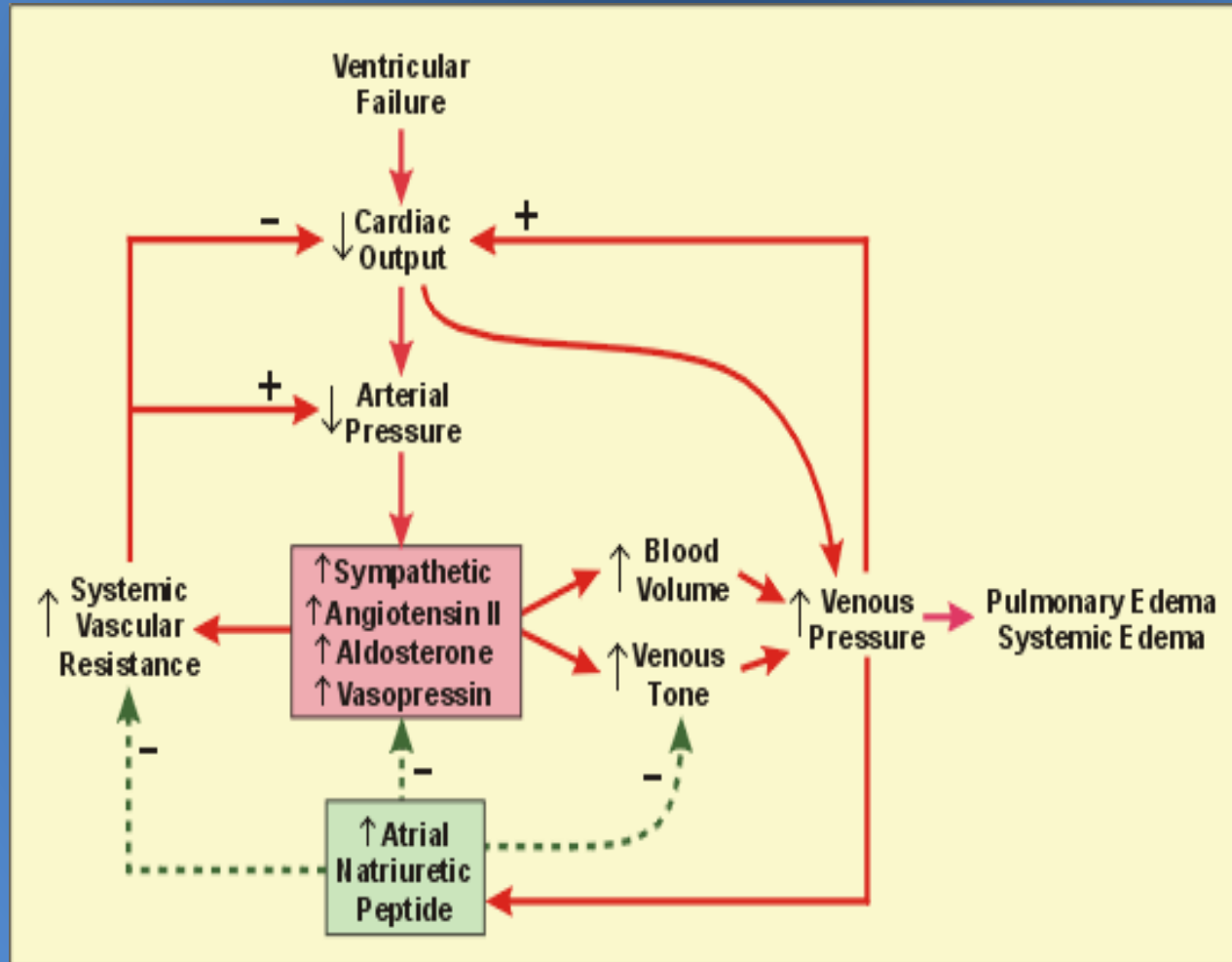
Diagnosis And Management

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DEFINITION

Heart failure (HF) is a complex clinical syndrome that can result from any structural or functional cardiac disorder that impairs the ability of the ventricle to fill with or eject blood.

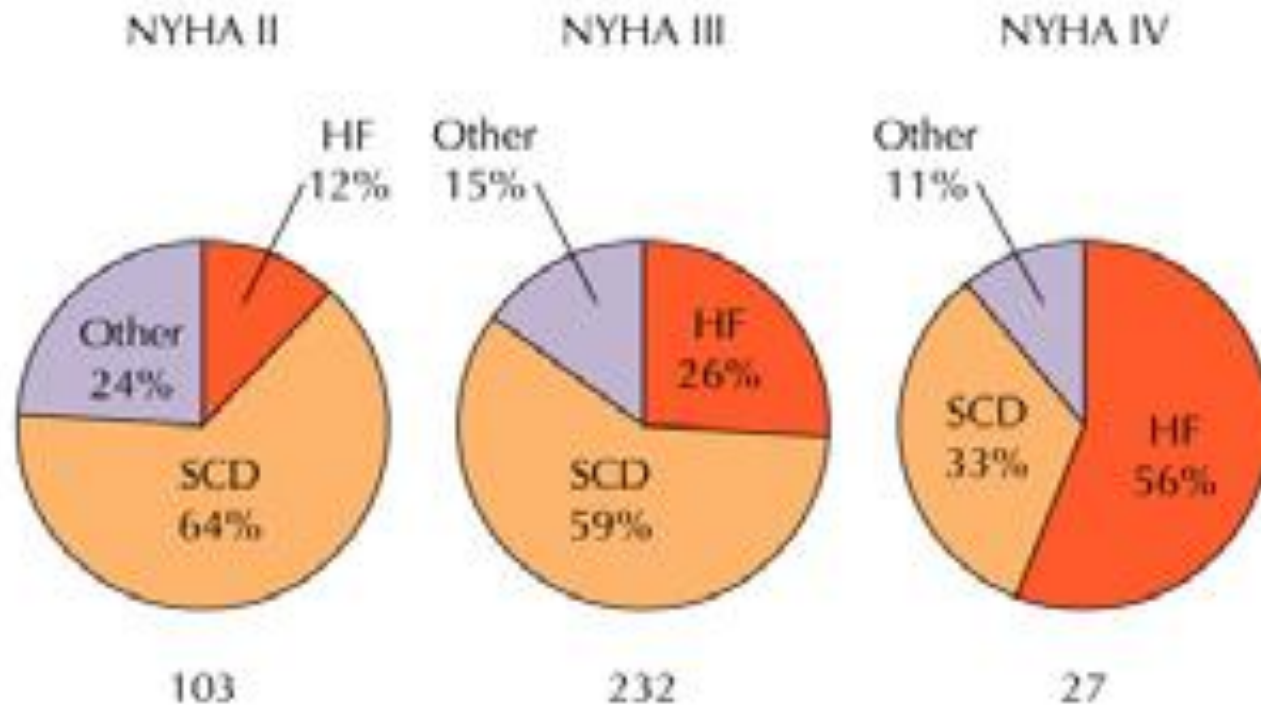
PATHOPHYSIOLOGY



Prevalence

- Prevalence 0.4-2% overall, 3-5 % in over 65s, 10% of over 80s
- Commonest medical reason for admission
- Annual mortality of 60% over 80s
- > 10% also have AF
- Progressive condition - median survival 5 years after diagnosis

Rates of Sudden Cardiac Death



C

Deaths, n

Typical Presentations Of Heart Failure

- 1) Syndrome of decrease exercise tolerance
- 2) Syndrome of fluid retention
- 3) No symptoms but incidental discovery of LV dysfunction

HISTORY

- Underlying causes –CAD, valvular disease, hypertension, family history etc.
- Aggravating factors –arrhythmias (AF), anaemia etc.
- Co-morbidities/differential diagnoses – COPD, obesity, chronic venous insuff etc.

Examination

- Raised JVP, peripheral oedema, ascites
- Signs of poor tissue perfusion
- Pulse –tachycardia, irregular, thready, pulsus alternans
- Added heart sounds, murmurs, bibasal inspiratory crackles

TESTS

- 12leadECG

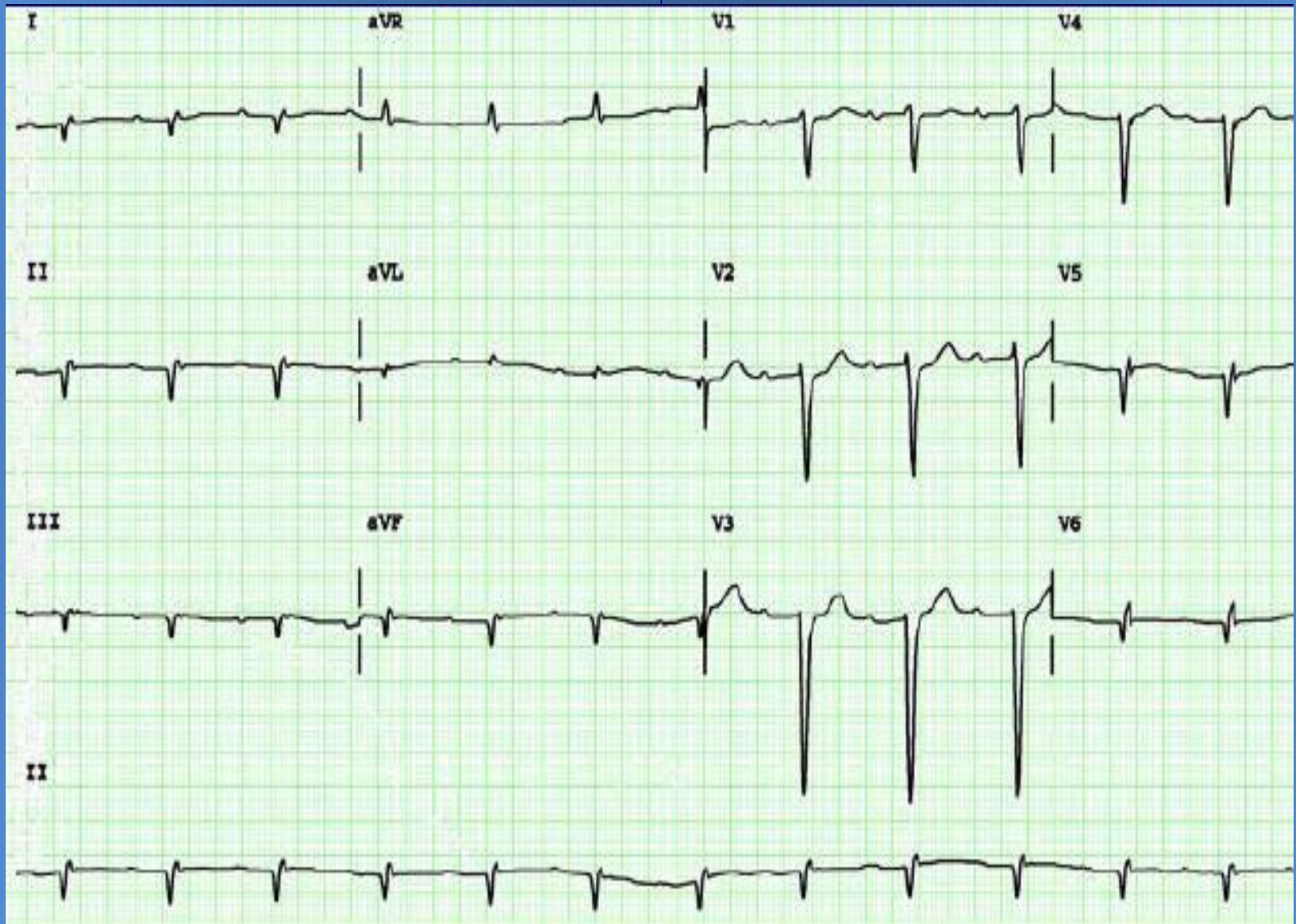
- CXR

- •BNP

- •Echocardiogram

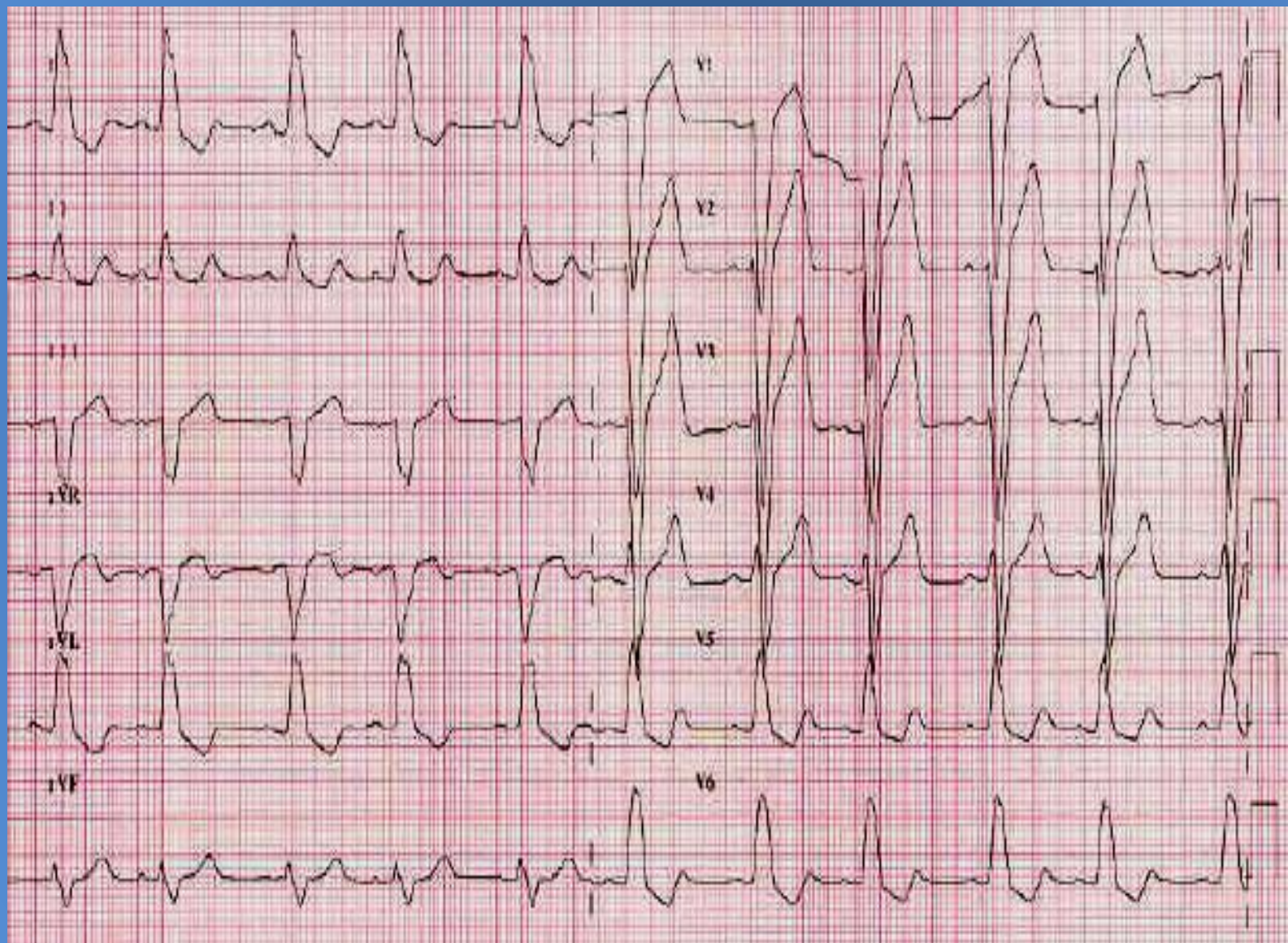
Low sensitivity and
specificity





EKG



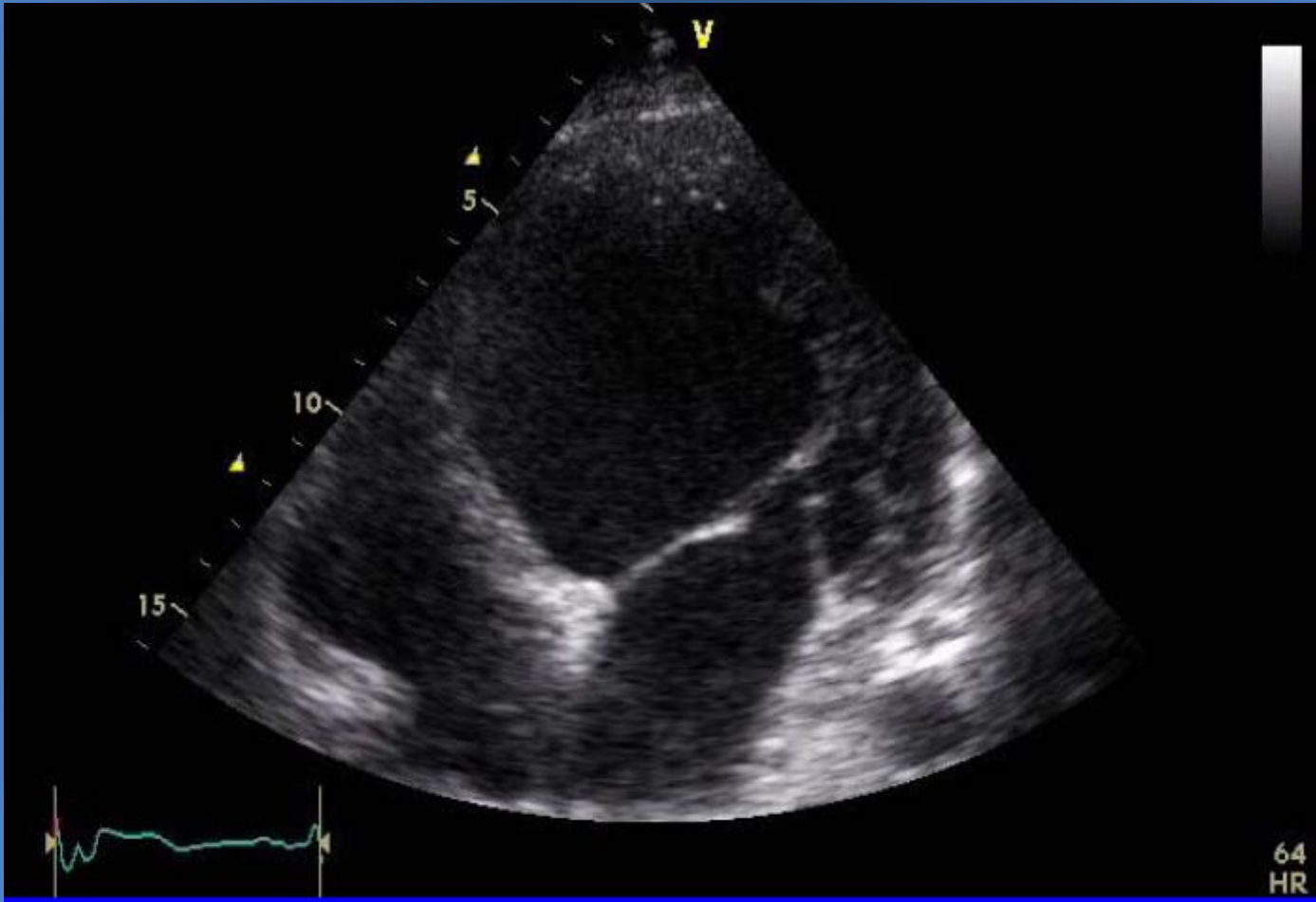


CXR



Echocardiogram





Classification of severity

- Class I - symptoms of HF only at activity levels that would limit normal individuals
- Class II - symptoms of HF with ordinary exertion
- Class III - symptoms of HF with less than ordinary exertion
- Class IV - symptoms of HF at rest

NYHA Class

- I No limitation of activities; They suffer no symptoms from ordinary activities
- II Slight, mild limitation of activity; They are comfortable with rest or with mild exertion
- III Marked limitation of activity; They are comfortable only at rest
- IV Confined to bed or chair; Any physical activity brings on discomfort and symptoms occur at rest

Stages of HF

- Stage A — High risk for HF, without structural heart disease or symptoms
- Stage B — Heart disease with asymptomatic left ventricular dysfunction
- Stage C — Prior or current symptoms of HF
- Stage D — Advanced heart disease and severely symptomatic or refractory HF

At Risk for Heart Failure

Heart Failure

Stage A

At high risk for HF but without structural heart disease or symptoms of HF.

e.g.: Patients with:

- hypertension
 - atherosclerotic disease
 - diabetes
 - metabolic syndrome
- or
- Patients
- using cardiotoxins
 - with HFx CM

Structural Heart Disease

Therapy Goals

- Treat hypertension
- Encourage smoking cessation
- Treat lipid disorders
- Encourage regular exercise
- Discourage alcohol intake, illicit drug use
- Control metabolic syndrome

Drugs

- ACEI or ARB in appropriate patients (see text) for vascular disease or diabetes

Stage B

Structural heart disease but without symptoms of HF.

e.g.: Patients with:

- previous MI
- LV remodeling including LVH and low EF
- asymptomatic valvular disease

Development of Symptoms of HF

Therapy Goals

- All measures under stage A

Drugs

- ACEI or ARB in appropriate patients (see text)
- Beta-blockers in appropriate patients (see text)

Devices in Selected Patients

- Implantable defibrillators

Stage C

Structural heart disease with prior or current symptoms of HF.

e.g.: Patients with:

- known structural heart disease
- and
- shortness of breath and fatigue, reduced exercise tolerance

Refractory Symptoms of HF at Rest

Therapy Goals

- All measures under stages A and B
- Dietary salt restriction
- Drugs for Routine Use
- Diuretic for fluid retention
- ACEI
- Beta-blockers

Drugs in Selected Patients

- Aldosterone antagonist
- ARBs
- Digitalis
- Hydralazine/nitrates

Devices in Selected Patients

- Biventricular pacing
- Implantable defibrillators

Stage D

Refractory HF requiring specialized interventions.

e.g.: Patients

who have marked symptoms at rest despite maximal medical therapy (e.g., those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions)

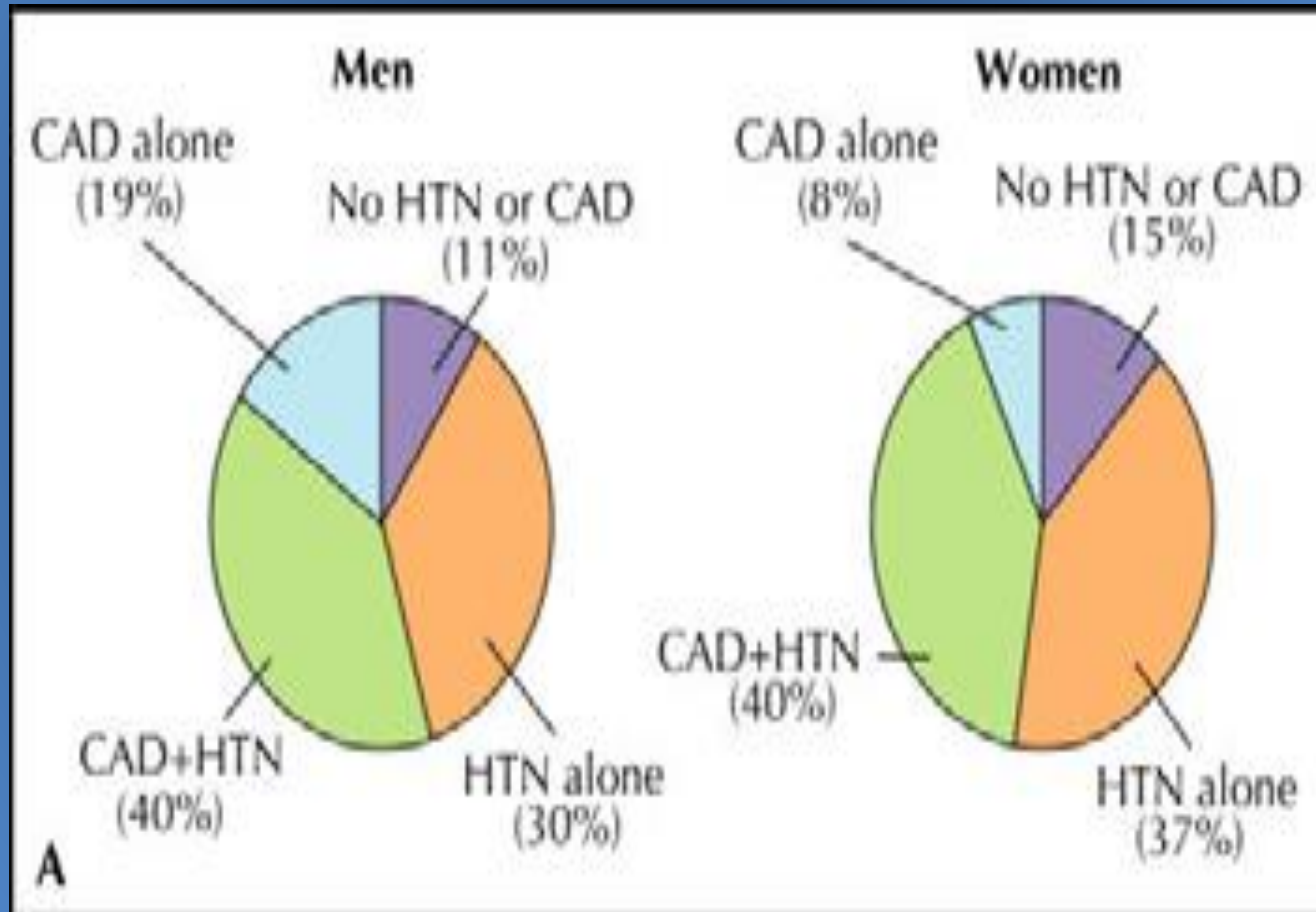
Therapy Goals

- Appropriate measures under stages A, B, C
- Decision re: appropriate level of care

Options

- Compassionate end-of-life care/hospice
- Extraordinary measures
 - heart transplant
 - chronic inotropes
 - permanent mechanical support
 - experimental surgery or drugs

Etiology



The major causes of heart failure in the developed world are ischaemic heart disease and hypertension

Diagnostic Work-up

- In all cases
- History, exam, ekg
- Echo
 - etiology
 - MR? LVEDD, RV fxn
- Labs
 - TSH, ferritin, Na, Cr
- Exercise testing
 - Prognosis, VO2Max
- Assessment of CAD
 - One of few reversible causes
- In selected cases
- Labs
 - Metanephrines
- Catheterization
 - CAD
 - Hemodynamics
- Endomyocardial biopsy
 - If infiltrative disease considered

Framingham criteria for congestive heart failure

Major criteria

Paroxysmal nocturnal dyspnea or orthopnea

Neck-vein distention

Rales

Cardiomegaly

Acute pulmonary edema

S₃ gallop

Increased venous pressure >16 cm of water

Circulation time >25 sec

Hepatojugular reflux

Minor criteria

Ankle edema

Night cough

Dyspnea on exertion

Hepatomegaly

Pleural effusion

Vital capacity decreased 1/3 from maximum

Tachycardia (rate of >120/min)

Major or minor criterion

Weight loss >4.5 kg in 5 days in response to treatment

For establishing a definite diagnosis of congestive heart failure in this study, two major or one major and two minor criteria had to be present concurrently.

Boston criteria for congestive heart failure

Criterion	Point value ^A
Category I: History	
Rest dyspnea	4
Orthopnea	4
Paroxysmal nocturnal dyspnea	3
Dyspnea on walking on level	2
Dyspnea on climbing	1
Category II: Physical examination	
Heart rate abnormality (if 91–110 beats/min, 1 point; if >110 beats/min, 2 points)	1–2
Jugular-venous pressure elevation (if >6 cm H ₂ O, 2 points; if >6 cm H ₂ O plus hepatomegaly or edema, 3 points)	2–3
Lung crackles (if basilar, 1 point; if more than basilar, 2 points)	1–2
Wheezing	3
Third heart sound	3
Category III: Chest radiography	
Alveolar pulmonary edema	4
Interstitial pulmonary edema	3
Bilateral pleural effusions	3
Cardiothoracic ratio >0.50 (posteroanterior projection)	3
Upper zone flow redistribution	2

Therapy

- **Aims for therapy**
- Reduce symptoms & improve QOL
- Reduce hospitalization
- Reduce mortality
 - ✓ Pump failure
 - ✓ Sudden cardiac death

The Donkey Analogy

Ventricular dysfunction limits a patient's ability to perform the routine activities of daily living...



Management of Heart Failure

- Overview
- Diagnosis and Evaluation
- Therapies
 - ✓ Diuretics
 - ✓ ACE-Inhibitors
 - ✓ Digoxin
 - ✓ Beta Blockers
- Recent non-Pharmacological Advances
 - Sudden Death & ICD's
 - Contractile Dysynchrony and Biventricular Pacing
- Diastolic Dysfunction

Diuretics in Heart Failure

□ Benefits

- Improves symptoms of congestion
- Can improve cardiac output
- Improved neurohormonal milieu
- No inherent nephrotoxicity

□ Limitations

- Oral absorption unpredictable
- Excessive volume depletion
- Electrolyte disturbance
- Unknown effects on mortality
- Ototoxicity

Diuretics, ACE Inhibitors

Reduce the number of sacks on the wagon



ACE Inhibitors

- Reduce mortality, MI, Symptoms
- Decrease preload and afterload
- CONSENSUS 1987 – enalapril vs. placebo – 31% reduction mortality in enalapril group
- Confirmed by SOLVD, AIRE, SAVE, TRACE
- 1995 meta-analysis showed 23% reduction total mortality, 35% in combined mortality/hosp admission
- Should be considered in all

Practical ACEI prescribing

- Test dose
- Titrate to higher end of range
- Continue indefinitely
- Caution in impaired renal function
- RAS / Aortic stenosis

Potential problems with ACEI

- Hyperkalaemia
- Hypotension
- Cough
- Hepatic and renal dysfunction
- Angiodema

β -Blockers

Limit the donkey's speed, thus saving energy



Beta-blockers

- US Carvedilol studies 1996
 - 65% decrease mortality in carvedilol group
 - 27% reduction in hospitalisations, reduction in progression of CCF
- CIBIS-II – Bisoprolol vs. placebo
 - 34% reduction mortality (42% reduction in sudden death)
 - 32% hospitalisations

Beta-blockers

- MERIT-HF - metoprolol
- COPERNICUS
 - NYHA class IV, EF < 25%
 - 35% reduction in mortality with carvedilol
- CAPRICORN - 23% reduction in mortality post MI

Practical Beta blocker prescribing

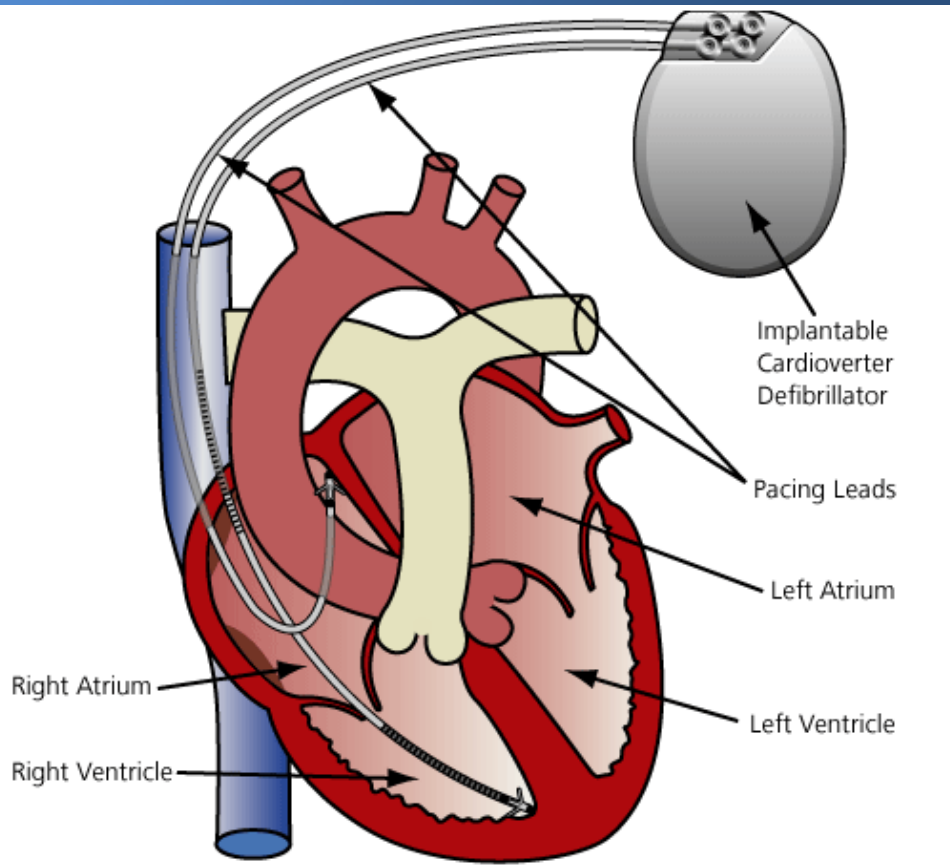
- “Start low, go slow”
 - Bisoprolol 1.25mg od
 - Carvedilol 3.125mg bd
- Not rescue therapy
- Contra indicated in PVD, severe bradycardia
- Cardioselective agents in mild to moderate reversible airways disease

Digitalis Compounds

Like the carrot placed in front of the donkey

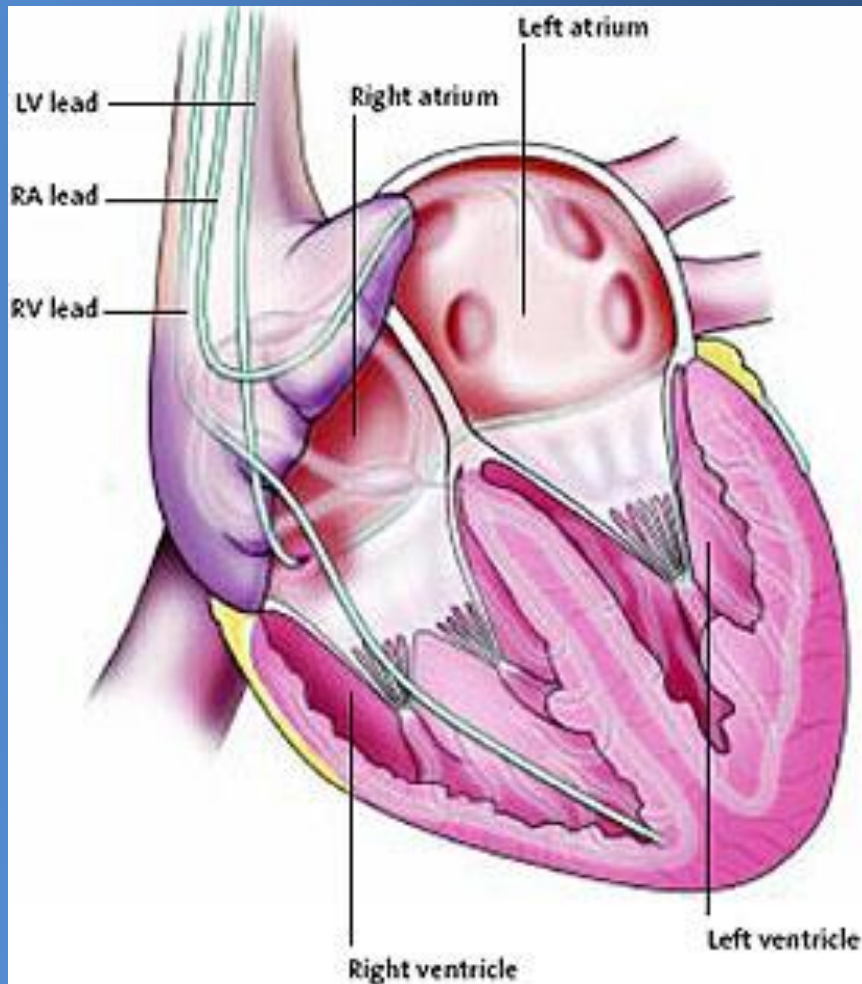


Implantable Cardioverter Defibrillator (ICD)



- 1-3 leads + pulse generator
- Sudden onset criteria
- Stability criteria
- Treatment zones
- Pacing
- Cardioversion
- Defibrillation
- Combined CRT-D available

Biventricular pacemaker



- Resynchronise ventricles by simultaneous pacing
- NICE guidance published 2007

Recommendations

- An ACE inhibitor should be given to all patients with heart failure unless there are contraindications. In patients intolerant of ACE inhibitors, ARBs are an alternative (level of evidence, A).
- In symptomatic patients with heart failure, beta-blockers are recommended to reduce mortality rates (level of evidence, A).
- Aldosterone antagonists are recommended to reduce mortality rates in certain patients with heart failure. These include patients with current or recent history of dyspnea at rest, and patients with recent myocardial infarction who have systolic dysfunction with either clinically significant signs of heart failure or with concomitant diabetes mellitus (level of evidence, B).

Recommendations

- For persistently symptomatic black patients with heart failure, direct-acting vasodilators reduce overall mortality rates when added to background therapy with ACE inhibitors, beta-blockers, and diuretics (if needed). Direct-acting vasodilators are also an alternative for patients with heart failure who are intolerant of ACE inhibitors (level of evidence, B).
- For patients with heart failure and volume overload, diuretics are recommended (level of evidence, B).

Heart Failure: More than just drugs.

- Dietary counseling
- Patient education
- Physical activity
- Medication compliance
- Aggressive follow-up
- Sudden death assessment

Treatment - general

- No added salt
- Treat / prevent \uparrow BP, IHD, EtOH
- Stop smoking
- Exercise and wt control
- Education



Patient education

- Understanding of need for treatment and it's risks and benefits
- Timing of doses – diuretics, nitrates
- Side effects of medicines
- Self management - monitor weight, oedema



Role of HF team

- Initiate, monitor and individualise therapy
- Education and support for pts and carers
- Liaison with Consultant and GP
- Encourage and facilitate self management
- Close links with Community matrons
- Telephone support
- End of life care – involvement of palliative care teams

Take home message

- Heart failure is a clinical diagnosis
- ACE- inhibitors should be titrated to highest doses tolerable
- Beta blockers should be used universally but must be titrated slowly
- Spironolactone should be used in III-IV patients but K⁺ needs to be monitored closely
- Digoxin can be used to reduce morbidity
- Role of ARB remains to be determined in patient tolerating BB & ACE-I
- Preventive therapy & patient education is the key to reduction of burden