

HEART FAILURE

→ Heart failure is a condition in which heart is unable to pump blood at a rate adequate for the requirements of body tissues.

Types of Heart failure

I. Acute heart failure

- Seen following A/c Myocardial Infarction, rupture of heart valve.
- Sudden ↓ in C.O → severe hypotension.
- Edema is not a feature

Chronic Heart failure

- Seen in Chronic Valvular Disease.
- BP may be maintained
- Edema in dependent parts is a feature.

II. Left Sided failure

LVF → congestion occurs in pulmonary circulation

↓
Dyspnea + Orthopnea
(due to pulmonary edema)

Right Sided failure

RVF → Congestion occurs in systemic circulation

↓

↑ JVP, hepatomegaly, ascites, edema in dependent parts.

III. High Output failure

→ Heart pumps abnormally large quantities of blood to deliver adequate oxygen to tissues.

- Severe anaemia
- Beriberi
- Hyperthyroidism
- AV fistula

Low Output failure

→ Due to failure of the heart to pump blood due to bad myocardial contractility.

IV.

Forward failure

Due to inability of ventricle to pump blood causing inadequate cardiac output.

Backward failure

↓ C.O. → ↑ EDV

↓
↑ ventricular pressure

↓
Pressure & volume in atrium & venous compartment behind the failed ventricle ↑

↓
Pulmonary & systemic congestion.

V.

Systolic failure

- Occurs due to systolic ventricular dysfunction.
(↓ myocardial contractility)
- Seen in Ischemic Heart Disease
- Systolic failure ↓ blood supply to tissues.

Diastolic failure

- Occurs due to failure of relaxation of ventricle
- Seen in restrictive cardiomyopathy - as in amyloidosis → where heart muscle is infiltrated by amyloid proteins.
- Inability to relax → EDV ↓
↓
CO ↓

Application of law of Laplace in heart failure

- Law of Laplace explains the disadvantage faced by a dilated heart (hypertrophied)
- $P = 2T/R$.
- when radius of cardiac chamber is ↑, a greater tension must be developed in myocardium to produce any given pressure
- Consequently, a dilated heart must do more work than a nondilated heart.

Clinical features

a) Dyspnea

a) Dyspnea: → Due to failure of Left Ventricle to pump blood effectively ⇒ produces tissue hypoxia.
→ In early stages - dyspnea only on exertion
In advanced stages - dyspnea even at rest.

b) Orthopnea: → Dyspnea in recumbent position.

Causes: → i) Redistribution of blood from abdomen & lower extremities into chest → causes an ↑ in pulmonary hydrostatic pressure

ii) Diaphragm pushed towards lungs → causes reduction in vital capacity.

c) Paroxysmal Nocturnal Dyspnea ⇒ Episodes of dyspnea

& cough of sudden onset in night awakening the patient from sleep

* Occurs partly due to depression of respiratory centers during sleep & partly due to accumulation of excess fluid in the lungs in recumbent posture in sleep.

d) Fatigue & Exercise Intolerance

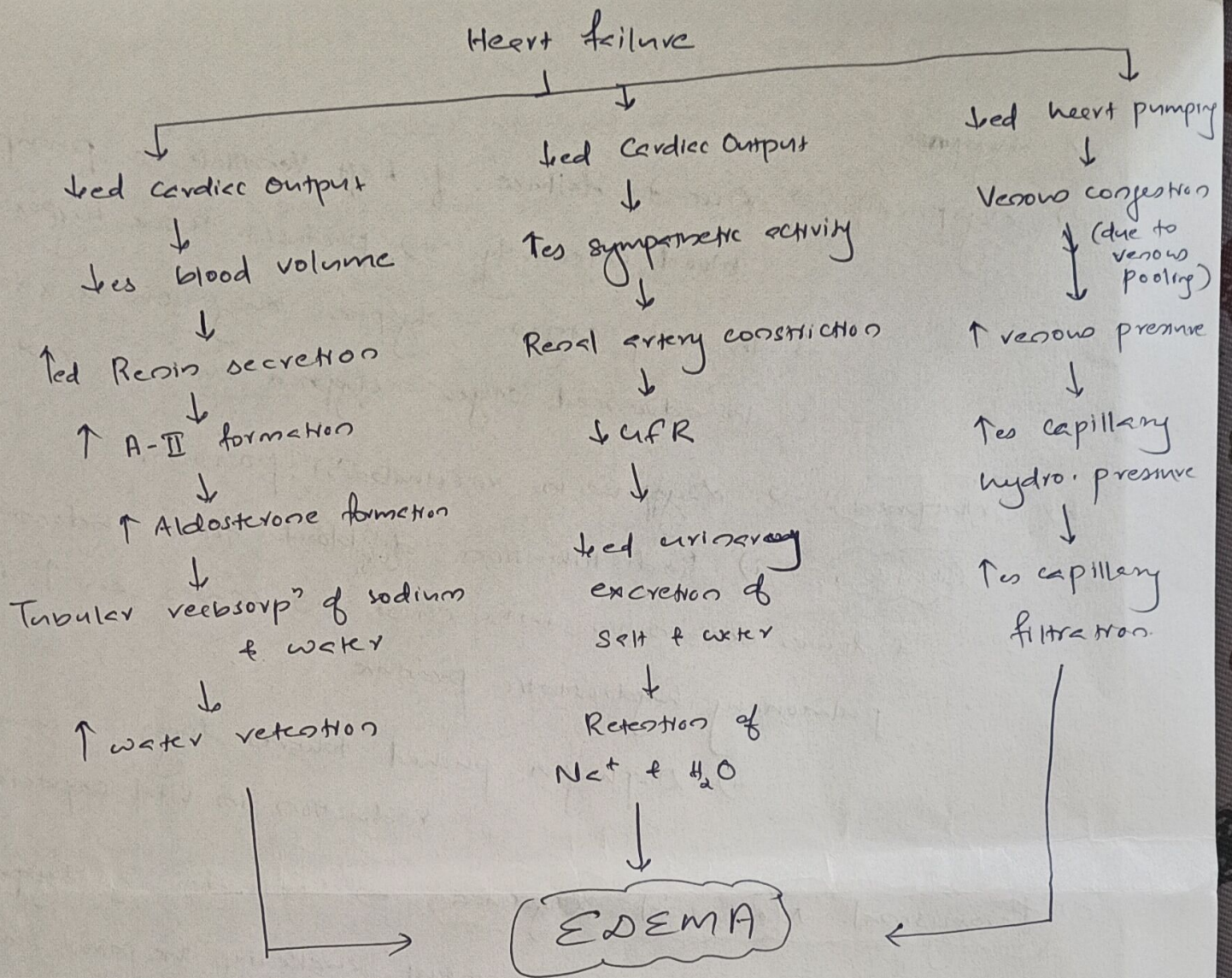
Fatigue → Due to ↓ed C.O → cause tissue hypoxia.

Exercise Intolerance → Due to ↓ed perfusion of skeletal muscles
↓
↓ed O₂ supply to meet the demands

e) Edema in dependent parts

Ankle/pedal edema - in ambulatory patients.

Sacral edema - in bedridden patients.



f) **Hepatomegaly**

→ Due to hepatic congestion

→ Tender hepatomegaly is an important feature of RVF.

g) **↑ JVP**

• ↑ RAP → ↑ JVP

• Reliable sign of CCF.

h) **Ascites**

→ Accumulation of excess free fluid in peritoneal cavity.

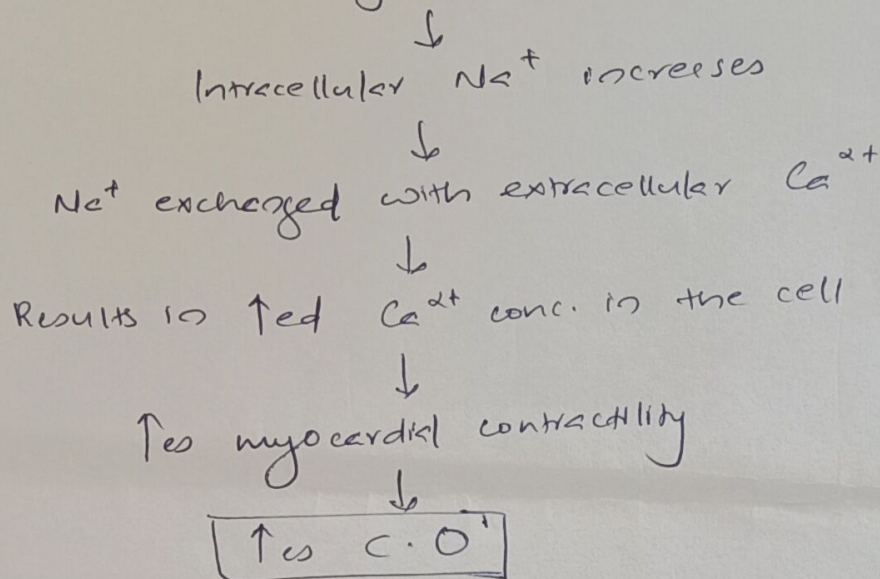
→ Occurs in advanced stages of heart failure.

Management

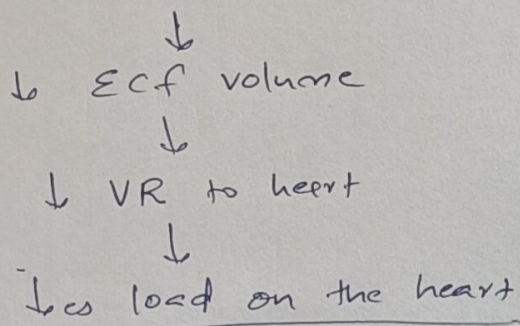
1) Rest :- Decreased physical activity less the demand on heart.
Adequate rest less venous pressure & congestion.

2) Salt-restricted diet :- to less water retention.

3) Digitalis :- Inhibits $\text{Na}^+ - \text{K}^+$ pump activity on myocardial cells



4) Diuretics :- promote water excretion.



5) Vasodilators :- Decrease peripheral resistance (afterload)
↓
C.O ↑es.

6) ACE Inhibitors :- prevent Angio-II formation.

7) Angiotensin Receptor Antagonists :- Prevents action of Angiotensin on blood vessels.

8) Removal of precipitating factors & T/T of primary cause