Heart Failure

Definition:

Abnormal failure of cardiac function to provide adequate blood flow to the body’s tissues and organs.

Causes of heart failure

1. Idiopathic.
2. Coronary Artery Disease.
3. Pressure Overload (Hypertension).
5. Toxins.
6. Endocrine (Diabetes, Thyrotoxicosis)
7. Infiltrative (Amyloidosis, Hemochromatosis)
8. Inflammatory (Rheumatic Fever and Valvular Damage – Infective Endocarditis)

Forms of Heart Failure:

1- **Systolic heart failure:**
Inability of the heart to contract strongly enough to provide adequate blood flow to the periphery.

2- **Diastolic dysfunction:**
Abnormal relaxation of the left ventricle => ↓ filling => ↑ left atrial and pulmonary venous pressures.

3- **Acute heart failure:**
When an individual who is completely asymptomatic before the onset of heart failure symptoms.

4- **Chronic heart failure:**
Symptoms develop over a long period of time.
Compensation for long periods & heart failure develops later.

Precipitants of Heart Failure:

1. Dietary (sodium and fluid).
2. Non-compliance with medications.
3. Development of cardiac arrhythmia
4. Uncontrolled Hypertension.
5. Other Medical illness (pneumonia, renal dysfunction)
6. New cardiac abnormality (Acute ischemia, acute valvular lesion)
Evaluation of Patients with Heart Failure

**History:**
- Dyspnea.
- Orthopnea: dyspnea is worsened by recumbency (↑ VR).
- Paroxysmal nocturnal dyspnea.
- Fatigue.
- Peripheral edema worsens during the day and decreases overnight.

**Physical findings**
- ↑ heart rate.
- Narrow pulse pressure.
- Bilateral basal crackles.
- Distended neck veins.
- Hepatomegaly (Congested Liver).
- Left ventricular enlargement.
- Left or right ventricular S3 or S4.
- Mitral and tricuspid regurgitation (CHF and ↑ with decompensation).
- Peripheral edema (↑ venous pressure & ↑ sodium and water retention).

**Investigations:**
- ECG is not specific, important in old MI, LVH, or significant arrhythmias.
- Chest X-ray: chamber enlargement and pulmonary congestion.
- ↓ serum sodium (Dilutional hyponatremia due to excess fluid).
- Impaired renal function (↓ renal perfusion and ↓ cardiac output).
- ↑ Liver enzyme levels due to hepatic congestion.
- Echocardiogram.

**Treatment**

*Non-Pharamacological Treatment*
- Restrict sodium intake to 2 g/day.
- Fluid intake should also be limited to avoid hyponatremia.
- Weight reduction in the obese ↓ cardiac workload.
- Supervised exercise cardiac rehabilitation program

*Pharamacological Treatment*

1- **Loop Diuretics:**
Rapid relief of pulmonary congestion and peripheral edema

2- **Vasodilators.**

3- **ACE inhibitors:**
↓ Symptoms through inhibiting angiotensin & ↓ afterload.
4- **Calcium Channel blockers:**
Better avoided because of their negative inotropic effect and activation of the sympathetic nervous system.

5- **Inotropics (Digoxin):**
Symptomatic improvement in patients with systolic dysfunction
- Indication: LV systolic dysfunction that remains symptomatic after treatment by ACE inhibitor and diuretic.
- Increase cardiac work and may induce further myocardial injury

6- **Beta—Blocker:**
It has antioxidant and a blocker action
- Improve symptoms and reduce mortality in mild-to-moderate LVF.
- Used after stabilization with ACE inhibitor, diuretic, and digoxin but who remains mildly to moderately impaired.

7- **Anticoagulants**
In cases of:
- Chronic atrial fibrillation or flutter.
- Mural thrombi.
- Sinus rhythm with left ventricular ejection fractions less than 20%.

**Acute Pulmonary Edema**

1. Supplemental oxygen.
2. Intravenous loop diuretic.
3. Sublingual or intravenous nitroglycerin (venodilatation =>↓ preload).
4. Intravenous morphine.
5. Arterial vasodilator nitroprusside: in severe ↑ BP to ↓ afterload.