

# **Congestive Cardiac Failure**

Dr Piyush Tailor  
Associate professor  
Govt. Medical College  
Surat

# Definition:

- A state in which the heart cannot provide sufficient cardiac output to satisfy the metabolic needs of the body

# Etiology

- **It is a common end point for many diseases of cardiovascular system**
- **Caused by :**
- Inappropriate work load
  - Volume overload
  - Pressure overload
- Restricted filling
- Myocardium loss

# Causes of Congestive Cardiac failure

- **Volume over load:**
  - ✓ Regurgitate valve
  - ✓ High output status - Anaemia ,Pregnancy, Thyrotoxicosis, Beri beri
- **Pressure overload:**
  - ✓ Systemic hypertension
  - ✓ Outflow obstruction - Aortic stenosis , Coarctation of Aorta
- **Loss of muscles:**
  - ✓ Myocardial Infaction, Chronic ischemia heart disease
  - ✓ Connective tissue diseases
    - ✓ E.g Marfan syndrome, Ehler Danlos Syndrome, Osteogenesis imperfecta
  - ✓ Infection – Bacterial Endocardiatis
  - ✓ Toxins - Alcohol, Iron ,Doxorubicin
- **Restricted Filling:**
  - ✓ Pericardial diseases – Pericaridal effusion
  - ✓ Restrictive cardiomyopathy
  - ✓ tachyarrhythmia

# Patho-physiological Changes

- Hemodynamic changes
- Neuro-hormonal changes
- Cellular changes

# Hemodynamic changes

- Stimulation to Baroreceptor (due to decrease BP & blood low)
- Increase Sympathatic activity
  - **Stimulate Alpha recceptor**
    - ✓ Vasoconstriction
    - ✓ Increase Blood Pressure
    - ✓ Increase Venous returns also
  - **Stimulate Beta recceptor**
    - ✓ Increase Heart Rate
    - ✓ Increase Contractility of heart

# Neuro-hormonal changes

<b>N/H changes</b>	<b>Favorable effect</b>	<b>Unfavorable effect</b>
<b>↑ Sympathetic activity</b>	↑ Heart Rate ↑ contractility Vasoconstriction → ↑ Venous return ↑ filling	Arteriolar constriction → After load → ↑ workload ↑ O <sub>2</sub> consumption
<b>↑ Renin-Angiotensin – Aldosterone</b>	Salt & water retention → ↑ Venous Return	Vasoconstriction → ↑ After load
<b>↑ Vasopressin</b>	Same effect	Same effect
<b>↑ interleukins &amp; TNF<math>\alpha</math></b>	May have roles in myocyte hypertrophy	Apoptosis
<b>↑ Endothelin</b>	Vasoconstriction → ↑ Venous Return	↑ After load

# Cellular changes

- Change in calcium homeostasis
- Remodelling of Heart muscle
  - Due to release of "Growth factor"
- Changes in contractile proteins (Frank - Sterling Law)
- Program cell death (Apoptosis)
- Increase amount of fibrous tissue



# Clinical Features

- Orthopnea
- Paroxysmal Nocturnal Dyspnea (PND)
- Low cardiac output symptoms
  - High diastolic BP & occasional decrease in systolic BP
  - Fatigue , Weakness , Breathlessness
  - Cold extremities
- Abdominal symptoms
  - Anorexia ,Nausea
  - Abdominal fullness , Right hypochondrial pain
- Raised Jugular Venous Pressure
- Rales (Inspiratory)
- Displaced and sustained apical impulses
- Third heart sound – low pitched sound that is heard
  - during rapid filling of ventricle

# Framingham Criteria for Diagnosis of CCF

## ■ Major Criteria

- ✓ PND
- ✓ Raise JVP
- ✓ Respiratory Rales
- ✓ Cardiomegaly
- ✓ Acute Pulmonary Edema
- ✓ S<sub>3</sub> Gallop
- ✓ Positive hepatic Jugular reflex
- ✓ Increase venous pressure more than 16 cm H<sub>2</sub>O

## ■ Minor Criteria

- ✓ Lower Limb edema
- ✓ Night cough
- ✓ Dyspnea on exertion
- ✓ Hepatomegaly
- ✓ Pleural effusion
- ✓ Decrease vital capacity by 1/3 of normal
- ✓ Tachycardia – 120 per min
- ✓ Weight loss 4.5 kg over 5 days management

# Differential diagnosis

- Bronchopneumonia
- Myocardial infarction
- Bronchial Asthma
- Liver diseases
- Nephrotic syndrome
- Pulmonary embolism

# Investigation

- ECG
- 2D Echo
- Liver Function Test
- Renal Function Test
- Electrolytes – Na<sup>+</sup> , K<sup>+</sup>
- Arterial Blood Gas Analysis
- X-ray Chest
- Central venous pressure
- Arterial Blood Gas Analysis

# TREATMENT

- Correction of reversible causes
  - Ischemia
  - Valvular heart disease
  - Thyrotoxicosis
  - Arrhythmia

# Diet and Activity

- Salt restriction
- Fluid restriction
- Daily weight
- Gradual exertion programs

# Medical Management

- **Diuretic**
  - Non – Potassium Sparing = Furosemide , Torsemide
  - Potassium sparing = Spironolactone , Triamterene
- **Chronotropics** = Digoxin , Dobutamine
- **Angiotensine Converting Enzyme Inhibitor** = Enalapril , Captopril
- **Vasodilator** = Nitroglycerin
- **Anti Coagulant** = Aspirin , Warfarin
- **Anti arrhythmic** = Amiodarone
- **Broncho-dilator** = Salbutamol , Ipratropium (Nebulization)

# Intervention Management

- Central Venous Line
- BIPAP (Bi-level Positive Airway Pressure ) Support
- Invasive Ventilator Support



# Prognosis

- Annual mortality rate depends on patients symptoms and LV function
- 5% Mortality = Mild LV dysfunction
- 30% to 50% Mortality = Advances LV dysfunction
- 40% – 50% of death = Severe LV dysfunction