

# CONGESTIVE HEART FAILURE

For Class- B.Pharmacy 2<sup>nd</sup> Semester  
Subject- Pathophysiology (BP204T)

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# \* CONGESTIVE HEART FAILURE

It is a situation or condition of the heart when heart fails to provide sufficient **cardiac output** so that there will be inadequate blood supply and oxygen supply throughout the body. In CHF cardiac muscle fails to contract sufficiently.

# \* CARDIAC OUTPUT

- The cardiac output is the amount of blood ejected from each ventricle every minute. The amount expelled by each contraction is the **stroke volume**. Cardiac output is expressed in litre per minute (l/min) and is calculated by multiplying the stroke volume by the heart rate (measured in beats per minute).
- $\text{CARDIAC OUTPUT} = \text{STROKE VOLUME} * \text{HEART RATE}$
- In a healthy adult at rest the stroke volume is approximately 70ml and if the heart rate is 72 per minute, the cardiac output is 5l/minute.

# \* RISK FACTOR OF CHF

- Major factors;
  - Hyperlipidemia;mainly cholesterol and cholesterol esters.
  - Hypertension
  - Cigarette smoking
  - DM
- Minor factors;
  - Obesity
  - Sedentary life style

- Male sex
- Increasing age
- Family history
- Stress
- Oral contraceptive pill
- High CHO intake

# \* PATHOPHYSIOLOGY OF CHF

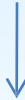
Heart failure



decrease C.O.



decrease B.P



decrease **GFR**



increase **Renin** release



ANG -2 formation



direct vasoconstriction



increase **After load..**

- ADH secretion increase contractility.
- ADH secretion causes salt & water retention;which increase **pre load..**



# \* DIAGNOSIS OF CHF

- **Chest X-ray**;this is very helpful in identifying the buildup of fluid in the lungs.the heart is usually enlarges in CHF,this may be visible in X-ray film.
- **Electrocardiogram(ECG)**;It is a painless test that measures the electrical activity of the heart(rhythm).
- **Blood test**;Low blood cell counts may cause symptoms much like CHF

- **MRI(Magnetic resonance imaging)**;It is used to provide images of the heart and its ability to pump blood to the body.
- **Cardiac catheterization(cath)**;In this case a small tube is inserted into an artery in the leg or arm.The catheter is moved to the heart to measure pressures inside the heart and to put contrast into the coronary arteries to look for blockages.

# \* DRUGS USED IN CHF

- Drugs that decrease preload
  - DIURETICS; **Frusemide**
  - NITRATE; **Isosorbide mono nitrate**
- Drugs that decrease afterload
  - VASODIALATORS; **Hydralazine, Nitroprusside**
- Drugs that decrease both preload & afterload
  - ACE inhibitors; **Captopril, Lisinopril**

- Drugs that increase contractility(**CARDIOTONICS**)
  - **CARDIAC GLYCOSIDE; Digoxin, Digitoxin**
  - **BETA AGONIST; Dopamine, Isoprenaline**
  - **PDE inhibitors(Phosphodiesterase enzyme); Amrinone, Milrinone**

# \* AIM OF DRUGS

- The ultimate aim of drug is to **increase force of contraction** → **Increase stroke volume** → **Increase cardiac output(C.O.)**
- If C.O is increased,
  1. **Cardiomegaly** will be corrected
  2. **Tachycardia** will be corrected
  3. **Oedema** will be corrected
  4. **Dyspnoea** will be corrected