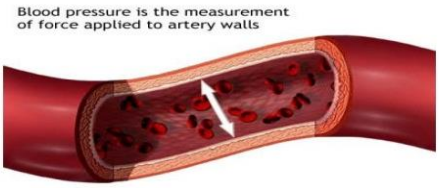
**Cardiovascular system**

- **Hypertension**
- **Angina**
- **Myocardial infarction**
- **Heart failure**
-

# Hypertension




## ➢ Blood pressure (BP) control :-

- **BP** → Pressure generated when the heart Contrast against the resistance of the blood vessels.
- **Cardiac output (CO)**:
- **CO** = Stroke volume (**SV**) X Heart rate (**HR**)

**BP = Cardiac output (CO) X Peripheral vascular resistance (PVR)**

- Increase CO → Increase BP.
- Increase PVR → Increase BP.
- Increase CO and PVR → Increase BP.

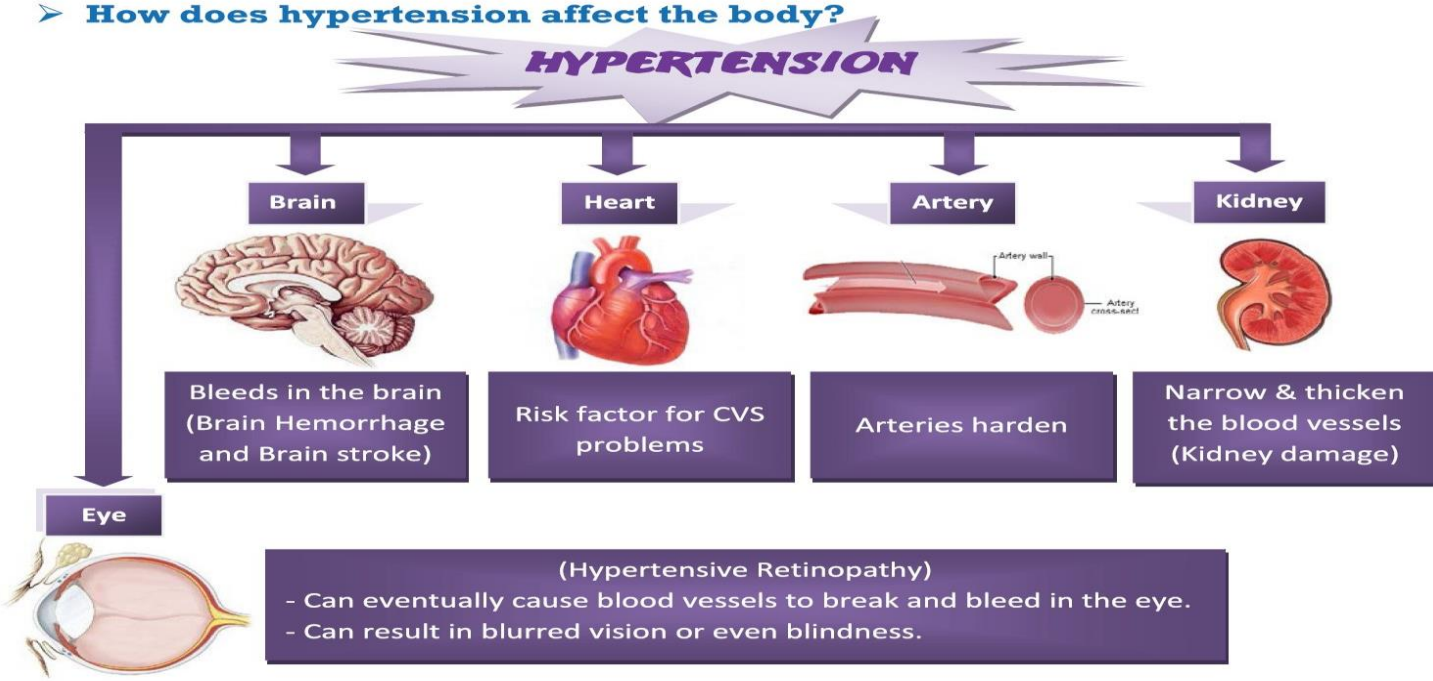


- **Drugs decrease BP :**
  - Drug decrease CO, PVR or decrease both.

## ➢ Definition of hypertension :-

- It is a condition in which both systolic and diastolic blood pressure rise above normal levels.

## ➢ How does hypertension affect the body?



Therapy used to control of hypertension

a- Diuretics : It increase the urinary output of water and sodium " prevention or correction of edema" through one of the following mechanisms:

1- Increasing the glomerular filtration rate .

2- Decreasing the rate at which sodium is reabsorbed from the glomerular

filtrate by the renal tubules, therefore water is excreted along with sodium

.

**B- angiotensin converting enzyme inhibitors**

**The ACE inhibitors, such as enalapril [e-NAL-ah-pril] and lisinopril [lyeSIN-oh-pril], are recommended as first-line treatment of hypertension in patients with a variety of compelling indications, including high coronary disease risk or history of diabetes, stroke, heart failure, myocardial infarction, or chronic kidney disease**

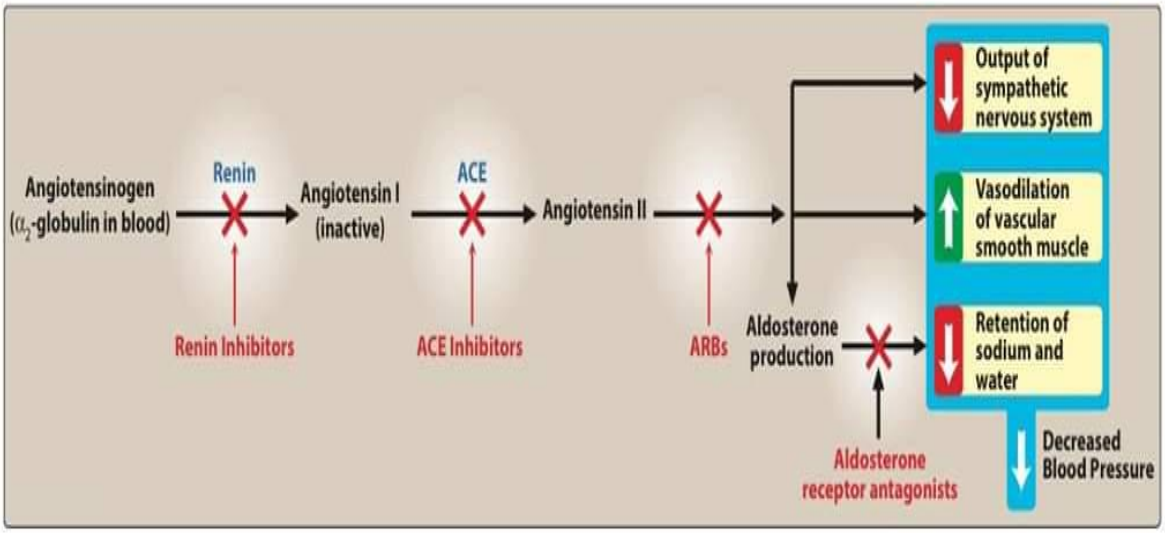



**Figure 17.10**

Effects of various drug classes on the renin–angiotensin–aldosterone system. Blue = drug target enzymes; red = drug class.

## BETA BLOCKERS

| DRUG | Mechanism | Uses | Side |
|---|---|---|---|
| Propranolol (indral ) | Non selective beta blocker | Hypertension , angnina , migraine , MI, | NOT RECOMMENDED IN ASTHMA , copd, diabetes and hypotension |
| Metaprolol | Selective | Hypertension , angina , Congestive heart failure , MI, | Bradycardia, sexual dysfunction |
| Carvedilol | Alpha and beta blocker | Hypertension and CHF | BRADYCARDIA, hypotension |

## D-ANGIOTENSIN II RECEPTOR BLOCKERS

The ARBs, such as losartan [LOW-sar-tan] and irbesartan [ir-be-SARtan], are alternatives to the ACE inhibitors. These drugs block the AT1 receptors, decreasing the activation of AT1 receptors by angiotensin II.

### E- Calcium channel blockers

**Verapamil [ver-AP-a-mil]**

**Diltiazem**

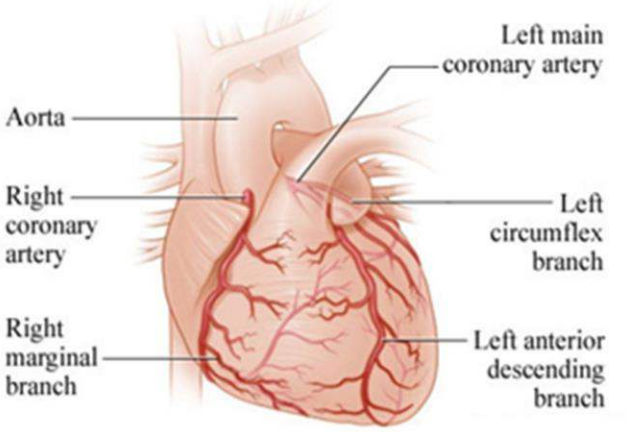
### F- Vasodilator

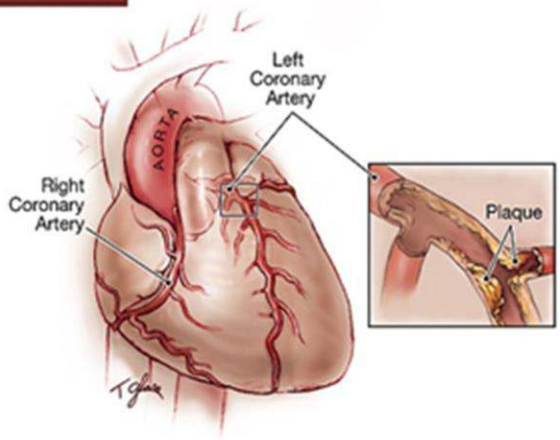
direct-acting smooth muscle relaxants, such as hydralazine [hyeDRAL-a-zeen] and minoxidil [min-OX-i-dill],

# Angina Pectoris

## ➢ Introduction:-

### Coronary Arteries




- Heart pump blood (which carry oxygen and nutrients) to the all body tissues.
- Heart need energy (Oxygen and nutrients) to pump the blood.
- Blood which carry oxygen and nutrients (Energy) pumped from the heart to the heart through coronary arteries.
- Increase heart rate due exercise → Heart need more blood through coronary arteries to able to pump the blood to the tissues.
- Coronary artery narrowing → Small amount of blood reached to the heart → decrease heart work → Angina pain.

➢ **Def.** → **Chest pain** caused by transient myocardial ischemia due to an imbalance between myocardial oxygen supply and oxygen demand.

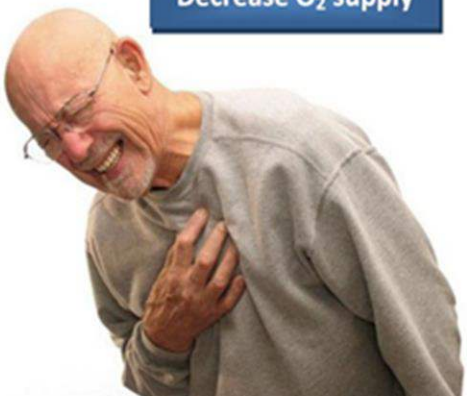
➢ **Pain:** Sudden, severe, pricking chest pain radiating to the neck, jaw, back and arms.

**Increase $O_2$ demand**






**Decrease $O_2$ supply**

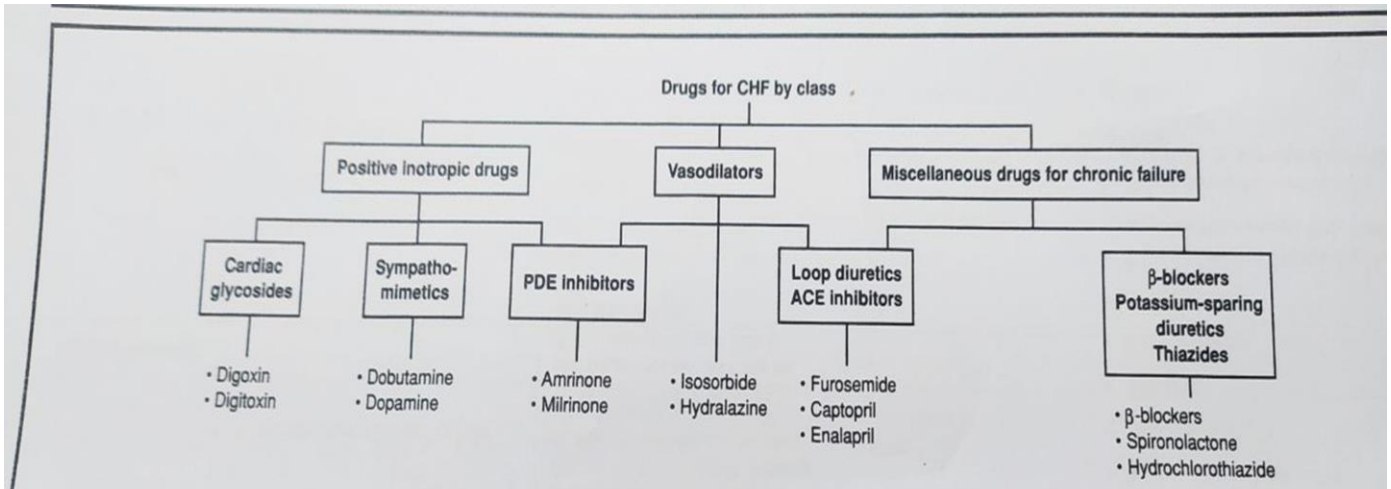


## Therapy :

**ß-BLOCKERS** Atenolol , Propranolol INDERAL

CALCIUM CHANNEL \Amlodipine ,) Diltiazem CARDIZEM Verapamil

ORGANIC NITRATES




*Steps in the treatment of CHF:*

1. *Reduce the workload of the heart (ABC): A) limit Activity level, B) Bring down [reduce] weight, C) Control hypertension.*
2. *Restrict sodium.*
3. *Restrict water intake (rare).*
4. *Administer diuretics.*
5. *Administer ACE inhibitors and digitalis compounds.*
6. *Administer vasodilators.*

REDMI NOTE 8
AI QUAD CAMERA