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Pharmacology
Chapter 5 : Drugs Acting on the Cardiovascular System

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Chapter 5

Drugs Acting On Cardiovascular System

Anti-Hypertensive Drugs

- → A condition in which the blood pressure of systemic artery increased beyond the normal pressure is known as Hypertension.
- → Normal range
  - Systolic = 120 above
  - Diastolic = 80 above
- → The drugs are used to treat High Blood Pressure are called Anti-hypertensive Drugs.

Classification

1) Diuretics :

- **Thiazides :** Chlorothiazide , Hydrochlorothiazide . chlorthalidone.
- **Potassium Sparing Diuretics :** Spironolectone , Amiloride.
- **Loop Diuretics :** Furosemide , Bumetanide.

4) Adrenergic drugs :

- **α blocker :** Prazosin , Doxazosin.
- **ß Blockers :** Atenolol , Propranolol.
- **α& ß blockers :** Labetalol , Carvedilol.

5) Calcium Channel Blockers : Verapamil , Amlodipine , Nifedipine.

6) Vasodilators : Hydralazine.

Pharmacological action

- Vasodilation , and lower SBP and DBP.
- Increase Blood Flow (Renal , Coronary etc.)
- Effect on CVS : Hypotension , fall in BP
- On Eye : miosis
- Decrease the heart rate
- Bronchodilation

Indication

- To treat hypertension.
- In congestive heart failure.
- In migraine.

Contraindication

- Hepatic and renal disease
- Peptic ulcer
- Any drug allergy
- Coronary artery disease

Doses

- Prazosin (1-15 mg/d)
- Doxazosin .(1-20 mg/d)
- Atenolol : (25 - 100mg daily)
- Propanolol : (80 - 240 mg 12 hourly)

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Anti Anginal Drugs

→ Angina is referred to chest pain due to low or no blood supply to the Heart muscles .
→ The Drugs are used to treat Angina pectoris are called anti anginal Drugs

Classification

1. **Vasodilators :**
   - **Nitrites and nitrates :** Isosorbide dinitrate Nitro -glycerine .
   - **Calcium Channel Blockers :** Verapamil , amlodipine , Nifedipine
   - **Potassium Channel Opener :** Nicorandil
2. **ß adrenoceptor antagonist (ß blockers) :** Atenolol , Prapranolol , Metoprolol.

Pharmacological Actions

- **Dilation :** they dilate the coronary arteries.
- **Blood Flow :** Reduce oxygen demand by increasing blood flow to the heart muscles.
- They dilate peripheral Blood vessels and decrease the load of heart.

Indications

- They are used to angina
- In MI
- Chronic heart failure

Contraindications

- Hypotension
- Low blood volume
- Pulmonary oedema
- left ventricle failure
- Cardiomyopathy (disease of heart muscles)
- Close angle Glaucom

Doses

- Isosorbide dinitrate : (5-10 mg sublingual) (20-40 mg sustained release oral)
- Nitro Glycerine : (0.5 mg sublingual) (5-15 mg oral) (5-20 ug /min i.v.)
- Nicorandil (5-20mg/ BD)

Anti- Arrhythmic Drugs

Arrhythmia

- → Cardiac arrhythmia is an abnormalit of heart rhythm
- → Arrhythmia is improper beating of heart whether irregular, toofast, or too slow.
- → Anti – Arrhythmic drugs may be used to control or correct cardiac rhythm.
- → The drugs are used to treat Arrhythmia are called Anti- Arrhythmic Drugs.
- → Also Known as Anti-dysrhythmic drugs, Anti-Fibrillatory drugs.

Classification

1) **Sodium Channel Blocker :** Quinidine , Procanamide , Lidocaine , Phenytoin.
2) **Beta blockers :** Atenolol , Propranolol
3) **Potassium channel blockers :** amiodaron , bretylium.
4) **Calcium Channel Blockers :** Verapamil , Nifedipine.

Pharmacological Actions

- They block mayocardial Na + Channels.
- They slow down heart rate.
- They block potassium channel in myocardium.

Indication

- Arrhythmia
- Atrial fibrillation (irregular or rapid heart rate)

Contraindications

- Hypersensitivity
- Coronary artery diseases
- Severe hepatic disorder

Doses

- Quinidine : (100-200mg/tds) oral
- Procainamide : (.5-1 g/d) oral
- Amiodaron (400-600mg/d) orally
- Sotlol (40-80mg/bd) orally.

Drugs Used In Atherosclerosis

Atherosclerosis

- → Formation of Plaque inside the arteries is referred to as a state of Atherosclerosis.
- → With the Time plaque harder and narrows the arteries.
- → As the arteries are narrowed the flow of oxygen rich blood to heart as well as to other areas of the body is reduced or stopped.

Drugs Used In Atherosclerosis

Classification

1. **HMG-CoA Reductase Inhibitors (Satins) :** Atorvastatin , Lovastatin .
2. **Bile Acid Sequestrants (Resins) :** Cholestyramine , Colestipol .
3. **Fibric Acid Derivatives (Fibrates) :** Clofibrate , Fenofibrate .
4. **Triglyceride Synthesis and lipolysis Inhibitors :** Nicotinic Acid , Probucol .
5. **Others :** Omega 3 fatty acids

Pharmacological Action

- They slow or inhibit the production / synthesis of cholesterol.
- They prevent deposition of lipids in blood vessels (formation of plaque)
- They bind with bile and prevent reabsorption of bile from GIT.

Indications

- They are used to treat hyperlipidemia.
- They are used to reduce the risk of MI.
- They are used to remove plaque in blood vessels.
- These are used to maintain or reduce cholesterol level.

Contraindication

- Liver Diseases
- In pregnant & lacting women
- Hypersensitivity
- Gall bladder disorder

Dose

- Cholestyramine (4 g / d in starting in divided dose)
- Colestipol (2-16 g /d in divided dose)
- Clofibrate (1.5 - 2 g /d in divided dose)
- Fenofibrate (50-150mg/ d) .
- Atorvastatin (10-20mg/d)
- Lovastatin (20-80mg/d)

Drugs used in congestive Heart failure

- → When a heart fails to pump blood in a quantity sufficient to fulfill the body requirements a condition of Congestive Heart Failures.
- → Also Known as heart failure.

due to CHF

- ➢ Narrowing of arteries
- ➢ Congenital Heart defects
- ➢ Infection or defect in heart valve
- ➢ Myocarditis (Infection of heart muscles)
- ➢ Cardiomyopathy (disease of heart muscles)

Symptoms

- Fatique
- Swelling or odema
- Shortness of breath
- Increased Urination

Classification

1) Drugs with Positive Inotropic Effects :

- **Cardiac glycosides :** Digoxin , Digitoxin , Oubain .
- **Bipyridines Or Phosphodiestrase Inhibitors :** Amrinone , Milrinone .
- **ß adrenergic agonist :** Dobutamine , Dopamine .

2) Drugs without Positive Inotropic Effects :

- **Diuretics :** Chlorothiazides , Furosemide , spironollectone.
- **ACEI :** Captopril , ramipril.
- **ß Blockers :** Atenolol , propranolol.
- **Vasodilators :** Nitrates , Hydralazine.

Pharmacological Action :

- Heart : They Provide strength the heart muscles and increase the contraction force of heart.
- Kidney : They Increase the blood flow to the kidney this increase urination and relifes odema patient with cardiac odema
- Effect on CNS : Digitalis may produced symptoms of visual disturbances such as blurring of vision etc.
- They cause Vasodilation.

Indications

- They are used to treat Congestive heart failure.
- Circulatory Shock
- Cardiac Arrhythmia etc.

Contraindications

- Hypersensitivity
- Aortic Diseases
- Hypokalamia
- Pulmonic Valve disease

Doses

- Milrinone : (0.375mcg/kg/min) maximum 1.13 mg kg /d .
- Amrinone (5-15mcg /kg/min) maximum 10mg /d .
- Dobutamine (2.5-10mcg/kg/min) maximum 40 mcg /kg In divided dose
- Dopamine (0.2-1mg /kg/min) maxm. 300-1200 mg in divided dose .

Drug Therapy For Shock

→ Shock is a condition in which our body cells does not get proper amount of oxygen (Hypoxia)
→ Which result in decreasement in tissue perfusion

↓ Oxygen (02) → ↓ Tissue Perfusion → Cell Death → Organ Damage → Like Heart etc..,,

Classification

1) **Sympathomimetics Amines :** Dobutamines, Adrenaline
2) **α-adrenorecptor blocking agent :** Pentolamine, Phenoxybenzamine.
3) **Dextrox :** Vasodilators, Diuretics.

Pharmacological Action

- Increase in Heart Rate
- Increase in Cardiac output
- Increase in Positive Inotropic effect

Indication

- It is used to treat shock.
- It is used to treat septic shocks (due to infection)
- It is used to treat CHF

Contraindication

- Severe Hypertension
- Hypokalamia
- Myocarditis
- Arrhythmias.

Doses

- Dopamine 0.2 -1 mg / kg / min
- Dobutamine 2.5 – 10 mg / kg / min