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**Subject: Genral Pharmacology II**

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**TOPIC:**

**Discuss various drugs classes used for hypertension and Cardiac heart failure**

A sustained rise in blood pressure.

It is a condition in which the arteries have persistently high blood pressure, making harder for the heart to pump blood in the vessels.

Basically it has 2 main components; the SYSTOLIC and the DIASTOLIC blood pressure.

> Stroke Volume And Heart Rate

Preload can be defined as the initial stretchingof the cardiac myocytes prior to contraction (EDV)

Afterload is the load against which the hearthas to pump(TPR).

**Drugs classes used for hypertension and Cardiac heart failure:**

* Centrally acting sympatholytic drugs
* Ganglionic Blockers
* Sympathetic Nerve Ending Blockers
* Adrenergic Receptor Blockers

a) Alpha 1 blockers

b) Beta blockers

c) Mixed blockers

* Direct Vasodilators
* Calcium Channel Blockers
* Angiotensin Converting Enzyme Inhibitors
* Angiotensin Receptor Blockers
* Renin Inhibitor
* Diuretics

1. **Centrally acting sympatholytic drugs:**

**Clonidine:**

* **Advantage**: Used in Hypertension when other drugs have not responded adequately.
* **Disadvantage:** Sedation, Depression, rebound hypertension on withdrawal.

**Alpha-Methyl Dopa:**

**Advantage**: Used in Hypertension when other drugs have not responded adequately. Has less effects on FETUS so can be used in pregnancy.

**Disadvantage**: Sedation, Depression, causes hematologic immune toxicity (making comb’s test +ve)

1. **Sympathetic Nerve Ending Blockers:**

**Guanethidine**

Replaces nor epinephrine in the vesicle and itself acts as false neurotransmitter.

**Disadvantage**: Orthostatic Hypotension.

**Reserpine**

Reserpine irreversibly blocks the Vesicular monoamine transporter. This normally transports free amine neurotransmitters from the cytoplasm of thepresynaptic nerve terminal into storage vesicles.

**Disadvantage**: Depression of CNS

**Metyrosine**

Makes the Tyrosine hydroxyls’ enzyme dysfunctional.

**Disadvantage**: Diarrhea, Trembling of hands and fingers

1. **Adrenergic Receptor Blockers:**

**A) Alpha blockers:**

**Selective:** Prazosine, terazosin

**Adverse Effect**: Orthostatic Hypotension

**Non-Selective**: Phenoxybenzamine, Phentolamine

**Adverse Effect**: Tachycardia, Palpitation

**B) Beta blockers :**

**Selective:** Metoprolol, Atenolol

**Adverse Effect**: Dizziness, Drowsiness, Fatigue, Diarrhea

**Non-Selective**: Propranolol

**Adverse Effect**: Drowsiness, Sedation, Asthma

**C) Mixed blockers:**

Acting on Alpha as well as on Beta receptors.

**Labetolol, Carvidolol, Bucindolol:**

**Adverse Effects:** Drowsiness, Fatigue, Insomnia, Orthostatic Hypotension

**NOTE**: Nebivolol is a newer beta blocker with some direct vasodilator action

Relatively very less adverse effects and is highly cardio selective

1. **Vasodilators:**

**Hydralazine:** Acts primarily on the arteries and arterioles.

* **Advantage:** Accepted method for controlling blood pressure in pregnant hypertensive’s.
* **Disadvantage**: Almost always causes reflex tachycardia.

**Minoxidil:** Dilates resistance vessels

* **Advantage:** Used in hypertension refractive to other drugs. Other use is causing hypertrichosis
* **Disadvantage**: Fluid retention, Reflex Tachycardia

1. **Calcium Channel Blockers**

**Verapamil:**

* Acts on both cardiac and smooth muscles(more action on heart)
* **Advantage**: Additional used in treatment of angina, supraventricular tachyarrhythmia’s, migraine headache
* **Disadvantage**: Facial flushing, dizziness, constipation

**Diltiazem:**

Acts on both cardiac and smooth muscles equally.

* **Advantage:** Used for hypertension, Angina
* **Disadvantage:** Hypotension, bradycardia

**Nifedipine**:

* Acts more on arterial smooth muscles than on heart
* **Advantage:** Vasoselective
* **Disadvantage**: Lethargy, Bradycardia, Hypotension

1. **Angiotensin Converting Enzyme Inhibitors**

Captopril, Enapril, Lisinopril, Prindropril, Ramipril

* **Advantage**: Effective in CCF and Diabetic Nephropathy too

**Angiotensin Receptor Blockers**

* + Losartan, Cadesartan, Valsartan, Telmisartan
* **Advantage**: Do not increase the bradycardia level.

**Renin inhibitors**

* + Aliskiren, Pepstatin
* **Advantage**: Acts directly on the required substrate.

1. **Diuretics**

**Advantage:**

Effective in controlling blood pressure in long term. Controls BP in Supine as well as standing positions so postural hypotension doesn’t occur.

* Loop Diuretics : Furosamide
* Thiazides : Hydrochlorothiazide Potassium Sparing Diuretics : Amiloride, Spironolactone

**Disadvantage:**

* Of Thiazides include, hypokalemia, hyperuricemia;
* Of Loop Diuretics include, Ototoxicity;
* Of Potassium Sparing group include, Gastric upsets,
* Gynecomastia in males, Menstrual irregularities in females.

**The End**