

Hypertension (HTN or HT)

Definition:

Hypertension, also known as high blood pressure (HBP), is a long term medical condition in which the blood pressure in the arteries is persistently elevated.

- ① The SBP (systolic blood pressure) will be more than or equal of 140 mmHg.
- ② The DBP (diastolic blood pressure) will be more than or equal of 90 mmHg.

Types:

i) Primary hypertension:

It also known as essential hypertension chronic high blood pressure without any association with other disease.

ii) Secondary hypertension:

Elevation of blood pressure associated with another disease such as kidney disease.

Stages of hypertension:

<u>Stage</u>	<u>SBP</u>	<u>DBP</u>
Normal	120 mmHg	80 mmHg
Prehypertension	120 - 139 mmHg	80 - 89 mmHg
Stage-1 hypertension	140 - 159 mmHg	90 - 99 mmHg
Stage-2 hypertension	160 - 179 mmHg	100 - 109 mmHg
Stage-3 hypertension	180 - 209 mmHg	110 - 119 mmHg

Risk Factors:

- ① Age - above 50 yrs.
- ① Alcohol, Smoking and DM
- ① Excessive dietary intake of sodium
- ① Gender.
- ① Family history.
- ① Obesity.
- ① Sedentary life style.
- ① Stress.

Pathophysiology of hypertension:

The normal blood pressure is maintained by four mechanisms.

- i) Sympathetic nervous system activities.
- ii) Activities of vascular endothelium.
- iii) Activities of renal system.
- iv) Activities of endocrine system.

Sympathetic Nervous System activities:

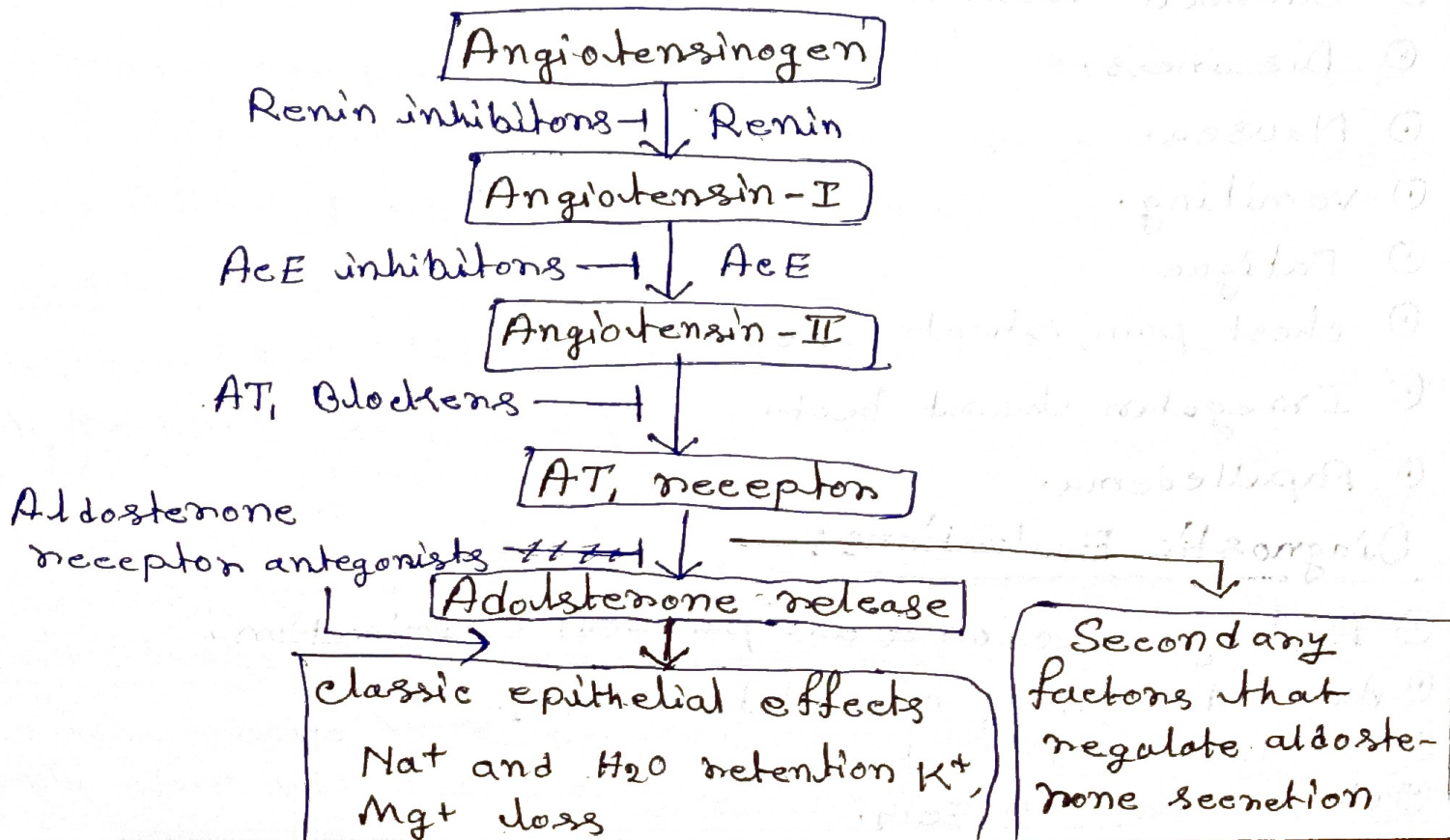
- ① When blood pressure (B.P) is decreasing the activation of SNS will occur. The increased SNS (Sympathetic Nervous System) activity increases the heart rate and cardiac contraction.
- ① The increased the heart rate and cardiac contraction produced vasoconstriction in the peripheral arterioles and promotes the release of renin from kidney.

The net effect of SNS activation is to increase the arterial blood pressure by increasing cardiac output and systemic vascular resistance.

Activities of Vascular Endothelium:

- ① Endothelial cells release both relaxing and contracting factors that modulate vascular smooth muscle tone and also participate in the pathophysiology of essential hypertension.
- ② The vascular endothelium is a single cell layer that lines the blood vessel.
- ③ These substances are potent vasoconstrictors and causes increases blood pressure level.

Activities of Renal System:



Activities of endocrine system:

- ① When the angiotensin-II is stimulated in the adrenal cortex, it will secrete aldosterone.
- ② The aldosterone will stimulate the kidneys to retain sodium and water.
- ③ Thus the BP (Blood pressure) and cardiac output will get increased.

Clinical features:

Sometimes the high blood pressure ~~does not~~ does not cause any ~~symp~~ Symptoms, so that it is known as a silent killer disease.

In some patients the symptoms will develop like,

- ① Severe head ache.
- ① Blurred vision.
- ① Dizziness.
- ① Nausea.
- ① Vomiting.
- ① Fatigue
- ① Chest pain, shortness of breath
- ① Irregular heart beat.
- ① Papilledema.

Diagnostic Evaluations:

- ① History collection and physical examination.
- ① Medical history of diabetes mellitus.
- ① Complete blood count.
- ① Chest X-ray
- ① ECG.

Management:

Mainly the management of hypertension is possible by two ways, which include -

① Life style modification.

② pharmacological therapy.

① Life style modification:

The life style modification measures mainly includes -

- i) weight reduction.
- ii) Dash diet (Dietary approaches to stop hypertension)
- iii) Dietary sodium reduction.
- iv) Reduce alcohol.
- v) Exercise
- vi) Stress management.

pharmacological therapy:

① various group of drugs are used for the treatment of hypertension, collectively these drugs are called as anti-hypertensive drugs, which includes.

Diuretics:

It helps the kidneys to inhibit the sodium reabsorption in the distal convoluted tubules, ~~ase~~ ascending limb and loop of henle.

Eg - chlorthalazide furosemide

Beta blockers:

These medications reduces the workload of the heart and blood vessel and causing the heart to beat slowly

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and with less force.

Ex- Atenolol, Propranolol.

Alpha blockers:

These medications causes the peripheral vasodilation of blood vessels.

Ex- Proxosin.

Vasodilators:

These medications acting directly on the muscle in the wall of arteries and preventing the muscles from tightening and arteries from narrowing.

Ex- Nitroglycerin, Sodium nitro-prusside.

ACE Inhibitors:

This group of medication will reduced the conversion of A-I to A-II and prevents.

Vasoconstriction.

A-I $\rightarrow$ Angiotensin-I

A-II $\rightarrow$ Angiotensin-II

Ex- captopril, Ramipril.

calcium channel blockers:

These medicines will block the movements of extra cellular calcium into the cells and causing vasodilation and decrease heart rate.

Ex- Amlodipine, verapamil.

Alternative therapies which are helpful to regulate blood pressure includes acupuncture relaxation techniques and diversional therapies.