

## Chapter – 2 Cardiovascular System

### Topic: HYPERTENSION

#### 2.1

#### Introduction

Hypertension is defined as the high blood pressure than the normal blood pressure.

Normal value:

- ❖ Systolic pressure— 110 to 140 mmHg
- ❖ Diastolic pressure— 60 to 80 mmHg.

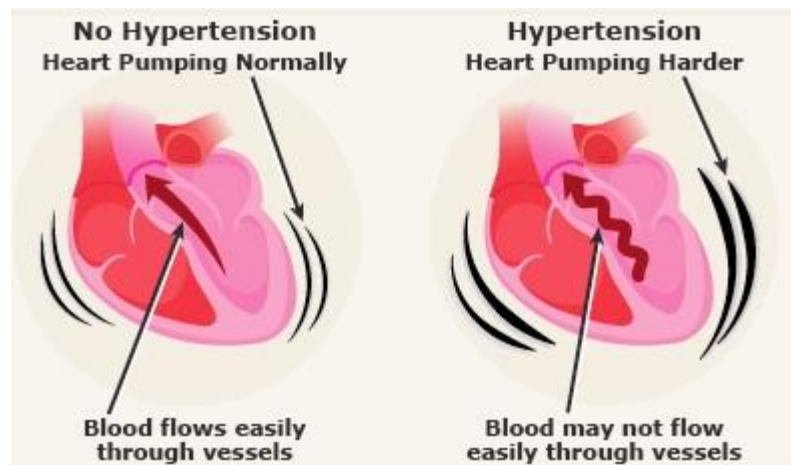
When the systolic and diastolic pressure remains elevated above 150 mmHg and 90 mmHg respectively then considered as the hypertension. Commonly there is increase only in systolic pressure, it is called as systolic hypertension.

Now blood pressure measurements are categorized as follows:

- **Normal:** systolic less than 120 mm Hg and diastolic less than 80 mm Hg.
- **Elevated:** systolic between 120-129 mm Hg and diastolic less than 80 mm Hg.
- **Stage 1:** systolic between 130-139 mm Hg or diastolic between 80-89 mm Hg.
- **Stage 2:** systolic at least 140 mm Hg or diastolic at least 90 mm Hg.

#### Types of hypertension:

1. Primary/Essential hypertension.
2. Secondary/systemic hypertension.



## 2.2

## Etiopathogenesis

**1. Primary hypertension** seen as the common types of the hypertension arises due to the increased peripheral resistance or external factors in the absence of any underlying diseases.

After the long term (without any precaution) it leads to develop the vascular damage, small blood vessels damage, cerebral hemorrhage, retinal hemorrhage and renal failure.

It varies— 100 mmHg to 250 mmHg. It can control but cannot cure.

**2. Secondary hypertension** arises due to some underlying disorders. It may be occurs during the body organs are not work proper or imbalance manner due to any internal effects or any infections. It is cured by treating the disease which responsible for hypertension.

**Example:**

- Renal hypertension- it arises due to obstruction of renal artery or improper glomerular filtration (glomerulonephritis).
- Endocrine hypertension- it is arises due to the hyper activity of the endocrine glands.
- Cardiovascular hypertension- it arises due to the any arterial blockage.

## 2.3

## Clinical manifestations

- ❖ Renal failure.
- ❖ Arrhythmia.
- ❖ Myocardial infarction.
- ❖ Dyspnea (shortness of breath).
- ❖ Cerebrovascular accident (strokes).
- ❖ Retinal hemorrhage.
- ❖ Left ventricular failure.

## 2.4

## Test for Detection

The following tests to detect heart and kidney problems:

- **Cholesterol test.** Also called a lipid profile, this will test your blood for your cholesterol levels.
- **Echocardiogram:** This test uses sound waves to make a picture of your heart.
- **Electrocardiogram (EKG or ECG):** An EKG records the electrical activity of your heart.

- **Kidney and other organ function tests:** These can include blood tests, urine tests, or ultrasounds to check how your kidneys and other organs are functioning.

## 2.5

## Pharmacological managements

**Classification of Drugs:**

- 1. Calcium channel blockers:** Agents block the calcium channels and reduce the contractility of myocardium. **e.g.** Phenylalkylamine, Benzothiazepine, dihydropyridines.
  - a. Dihydropyridine: e.g.** Nifedipine, Amlodipine, Nicardipine
  - b. Non dihydropyridine: e.g.** Verapamil, Diltiazem
- 2. Vasodilators:** Agent reduces the blood pressure by the vasodilation. **e.g.** Sodium nitroprusside, Hydralazine, Minoxidil, Diazoxide.
- 3. Diuretics:** diuretics cause diuresis and reduce the ECF volume and blood volume.
  - a. Loop Diuretics: e.g.** Frusemide, Torsemide
  - b. Potassium –sparing diuretics: e.g.** Amiloride, Triameterene, Spironolactone
- 4. Angiotensin converting enzyme inhibitors (ACE inhibitors):** it reduce the blood pressure by blocking the formation of angiotensin.**e.g.** Captopril, Ramipril, Perindopril Lisinopril.
- 5. Angiotensin (AT1) receptor blocker: e.g.** Losartan, Telmisartan, valsartan, eprosartan.
- 6. Sympathetic inhibitors:**
  - a) Alpha Beta adrenergic blockers: e.g.** Arotinolol, Labetalol, Carvedilol, Bucindolol.
  - b) Alpha adrenergic blockers: e.g.** Prazosin, Doxazosin, Naftopidil, Phenoxybenzamine.
  - c) Beta adrenergic blockers: e.g.** Atenolol, Metoprolol, Timolol, Oxprenolol, Nipradilol.
  - d) Central sympatholytics: e.g.** Methyldopa, Reserpine, Clonidine.

## 2.5

## Non pharmacological management

**Nutritional Management**

- ❖ Restriction of sodium,
- ❖ Restricted cholesterol.
- ❖ DASH (Dietary approach for stop hypertension)'
- ❖ Other management:
  - Reduce weight,
  - Regular moderate exercise

- Cessation of smoking'
- Moderate of alcohol consumption'
- Stress management.

### **General Management**

- ❖ Follow the proper routine of the regular activities (wake up, sleeps, natural urges).
- ❖ Follow regular exercise and workout (prevents the fat deposition and remove the excessive fats).
- ❖ Follow the yoga and meditation (which maintain the oxygen and carbon dioxide level).
- ❖ Make the proper diet chart after consulting the specialist and follow them. (Take- green vegetables, natural fruit juice, less fatty substance, and avoid the street food items).
- ❖ Avoid the polluted area and spend the time where fresh air blown.