Hypertension
The normal radial artery blood pressures in adults are: Systolic arterial pressure: 100 to 140 mmHg. Diastolic arterial pressure: 60 to 90 mmHg. These pressures are called Normal blood pressure or (normo-tensive pressure).
Stage I hypertension: systolic (140-159 mmHg) and/or diastolic (90-99 mmHg).
Stage II hypertension: systolic (≥160 mmHg) and/or diastolic (≥100 mmHg).
BP = TPR * CO  
Where, BP: blood pressure; TPR: Total peripheral resistance; CO: cardiac output.
Where, CO = SV * HR  
SV: stroke volume; HR: Heart rate.
**Types of hypertension:**

• In more than 95% of cases a specific underlying cause of hypertension cannot be found. Such patients are said to have (essential hypertension). In reality the problem is probably multi-factorial. Genetic factors and environmental factors including high salt intake, heavy consumption of alcohol, obesity, and impaired intra-uterine growth.
About 5% of cases, hypertension shown to be a consequence of a specific disease or abnormality leading to Na retention and/or peripheral vasoconstriction (secondary hypertension).
• Risk factors
• 1-Fixed
• Age, Sex, Family history
• 2-Variables
• Obesity, smoking, Diabetes mellitus,
• High cholesterol
The possible causes:

A. Alcohol.
B. Pregnancy: Pre-eclampsia / eclampsia: pregnancy specific syndrome with elevated blood pressure that occurs after the first 20 weeks of pregnancy and accompanied by proteinuria and edema.
C. Renal diseases: Renal vascular disease (renal artery stenosis) and kidney diseases
D. Coarctation of aorta
E. Endocrine diseases:

1. Phaeochromocytoma: It is mostly benign tumor of the adrenal medulla with increase secretion of epinephrine and nor-epinephrine, so it causes paroxysmal hypertension but may be persist.

2. Cushing syndrome: elevated level of cortisol has mineralo-corticoid effect.

3. Primary hyperaldosteronism (Conn's syndrome).

4. Thyrotoxicosis: high thyroid hormone associated with increase in systolic pressure due to increase activity of the heart (increase stroke volume and heart rate) and decrease diastolic pressure due to vasodilatation.
F. Drugs: example oral contraceptives containing estrogen, corticosteroids,
• Clinical findings and diagnosis
Investigations
1-General
General urine examination
Urea and electrolytes
FBP
Creatinine
ECG
Echocardiogram
Lipid profile
Chest x-ray
2-Specific investigations
• Complications of hypertension
A. Central nervous system:

   Stroke: is common complication of hypertension and may be due to cerebral hemorrhage or infarction.

   Hypertensive encephalopathy: it is rare condition characterized by high blood pressure and neurological symptoms including transient disturbance of speech and vision, paraesthesiae, disorientation.
B. Heart: 1-left ventricular hypertrophy 2-atrial fibrillation 3-Ischemic heart disease (Angina and infarction) 4- left ventricular failure and pulmonary edema.

C. Kidney: renal disease may result be result of hypertensive damage to renal vessels. Long standing hypertension may cause protein-uria, and progressive renal failure.

D. Retina: hypertensive retino-pathy: long standing hypertension results in compensatory thickening of arterial wall, which effectively reduces capillary perfusion pressure. With sudden increase of blood pressure hemorrhage is likely to occur.
E. Malignant or accelerating hypertension in young age: This rare complicate hypertension of any etiology and is characterized by accelerated micro-vascular damage with necrosis in the wall of small arteries and arterioles (fibrinoid necrosis) and intra-vascular thromosis. The diagnosis is based on evidence of high blood pressure and rapidly progressive end-organ damage such as retinopathy, renal failure and/or hypertensive encephalo-pathy. Left ventricular failure may occur, and if this is untreated, death occurs within months.
Prevention

- **Weight reduction** and regular **aerobic exercise** (e.g., walking):
- Reducing dietary sugar.
- Reducing **sodium** (salt) in the body
- Additional dietary changes beneficial to reducing blood pressure include the **DASH diet** (**dietary approaches to stop hypertension**)
- Discontinuing **tobacco use**
- Limiting alcohol intake
- Reducing **stress**, for example with relaxation therapy,
Treatment

Lifestyle modifications

• Lose weight if overweight
• Limit alcohol
• Increase physical activity
• Decrease sodium intake
• Keep potassium intake at adequate levels
• Take in adequate amounts of calcium and magnesium
• Decrease intake of saturated fat and cholesterol
• Stop smoking
Orthostatic (or postural) hypotension (a fall in blood pressure of $\geq 20/10$ mmHg from lying to standing position):

1. It is an abnormal drop in blood pressure on assumption of standing position. It is caused by:
   1. Reduced blood or fluid volume: as in excessive use of diuretics, loss of GIT fluid (diarrhea and vomiting), and loss of fluid in prolong bed rest.
   2. Drugs induce hypotension: anti-hypertensive drugs and psychotropic drugs.
   3. Aging: weakness and dizziness on standing are common complaints of elderly persons. Postprandial (after meal) blood pressure often decreases in elderly persons especially after a high-carbohydrate meal.
4. **Bed rest and immobility:** Prolonged bed rest promotes a reduction in plasma volume, a decrease in venous tone, failure of peripheral vasoconstriction, and weakness of skeletal muscles that support the veins and assist in returning blood to the heart.

5. **Disorder of autonomic nervous system function:**