Hypertension

Definition: it is the level of blood pressure at which the benefit of treatment over come cost and hazard.

- Blood pressure classified into :

Class	Systolic (mmHg)	Diastolic (mmHg)
Normal	<120	<80
Pre HTN	120-139	80-89
Stage I HTN	140-159	90-99
Stage II HTN	<160	<100

- Blood pressure is lower than the above scheme in children and during pregnancy.
- Blood pressure increases with age and there is increase in the incidence of cardiovascular diseases including CAD and stroke with increasing age and increasing blood pressure.
- Lowering the blood pressure will result in decrease in the risk of cardiovascular diseases taking in consideration the other risk factors for cardiovascular diseases, including diabetes, hypercholesterolemia, smoking, obesity, lack of exercise and family history of cardiovascular diseases.
- Lowering blood pressure in patient with multiple risk factors is more beneficial in decreasing the high risk of cardiovascular diseases.

Measurement of blood pressure:

The patient must be in sitting position with the arm supported at the level of the heart and remove the tight cloths compressing the arm and you have to take phase 5 Korotkoff sound (disappearance of sound which indicate diastolic blood pressure) rather than phase 4 (muffling of the sound). If the blood pressure is high, you have to repeat it after 5 minutes. Also you need to measures blood pressure in standing position in elderly, diabetic and in those who suffering from postural hypotension.

Single measurement of blood pressure is not useful, you have to repeat it at least twice at separate occasions to put the diagnosis.

Stress, anxiety and unfamiliar surrounding will cause increase in blood pressure at clinic, but when the patient goes to home and measure the blood pressure, he find it normal. This is called White coat hypertension" and those patients are at higher risk for getting cardiovascular diseases than normal persons but at lower risk than genuine hypertension.

50% of hypertensive population are undiagnosed. 50% of the diagnosed hypertensive(s) are not using medications. 50% of patients using medications are uncontrolled.

Etiology:

95% of hypertension due to no apparent cause and there are multiple theories about it. Probably due to renal causes, increased sympathetic activity or high peripheral vascular resistance.

This group of patients are called Primary hypertension" or Essential hypertension". The cause is seemed to be multifactorial. 40-60% of cases there is family history of hypertension.

Environmental factors in hypertension include hiqh salt intake, hic7h alcohol in take, obesity and lock of exercise.

'Secondary hypertension" involve 5% of hypertension, it occurs more in young age group, keeping in mind that primary hypertension still the most common cause even in young age group.

In secondary hypertension usually there's cause and the causes are:

1. Pregnancy (eclampsia and pre-eclampsia).	
2. Alcohol intake.	
3. Coarctation of aorta.	
4. Renal	1. Renal vascular diseases e.g. renal artery stenosis. 2. Parerichymal renal diseases including chronic

	GN, acute GN, chronic pyelonephritis, polycystic disease and diabetic nephropathy. Acute pyelonephritis not causes hypertension.
5. Endocrine	1. Hypo and hyperthyroidism. 2. Hyperparathyroidism. 3. Cushing's syndrome. 4. Pheochromacytoma. 5. Acromegaly. 6. Conn's disease. 7. Congenital adrenal hyperplasia.
6. Drugs	1. Oral contraceptive pills (containing estrogen) . 2. Anabolic steroids. 3. Corticosteroids 4. NSAID(s). 5. Carbenoxolone. 6. Sympathomimetic drugs.
7. Neurological	1. Brain tumor. 2. Sleep apnea. 3. Spinal cord injury. 4. Lead poisoning. 5. Porpyia.
8. Toxins	1. Alcohol withdrawal. 2. Anxiety and stress. 3. Postoperative.

Symptoms of hypertension:

Hypertension may cause headache but usually hypertension without complication is asymptomatic. Hypertension is discovered at routine physical examination or when complications occur.

Effects of hypertension:

Hypertension has an effect on the following organs and can result in end organ damage:

A. Blood vessels:

Hypertension affects arteries> 1mm in diameter resulting in thickening of the internal elastic laminae. Hypertrophy of the smooth muscles with deposition of fibrous tissue so the blood vessels become tortuous and their walls become less compliant.

On blood vessels < 1mm in diameter, it causes arteriosclerosis with narrowing of the lumen of the blood vessels and formation of microaneurysms. There is also wide spread atheroma that predispose for stroke or cardiovascular diseases.

Hypertension plays role in the pathogenesis of aortic aneurysm and aortic dissection.

B. CNS:

Hypertension increase the incidence of stroke both due to hemorrhage or infarction, also hypertension increases the incidence of carotid atheroma and transient ischemic attack. Also hypertension increases the risk of subarachnoid hemorrhage. There is an entity called "Thypertensive encephalopathy" that is characterized by high blood pressure associated with disturbance in speech and vision, numbness, parasthesia, disturb level of consciousness and may lead to fit and comma. If you arrange for CT-scan, there is a area of hemorrhage around the basal ganglia and the condition is reversible if you control the blood pressure.

C. Retina:

There are 4 grades of hypertensive retinopathy:

GI - There is arteriolar thickening with high tortuousity and high light refractiveness (Sliver wire appearance).

GII- There is arteriovenous nipping (which means constriction of the vein at the arterial crossing).

GIII- There is executes with hemorrhage. Two types of exudates are present, cotton-wool exudates due to infarction or ischemia and resolve within week and hard exudates in which there is dense white area due to deposition of lipid.

GIV - In addition to Gill, there is papilloedema.

D. Heart:

Major morbidity and mortality comes from high incidence of cardiovascular diseases, in addition to that hypertension cause load on the left ventricle resulting in left ventricular heave with 54 and by ECG there is left ventricular hypertrophy. Also hypertension increase the incidence of atrial fibrillation due to left ventricular dysfunction and CAD. Again hypertension can

lead to left ventricular failure without CAD especially if there is renal dysfunction with impairment of Na^+ excretion.

D. Kidney :

Proteinuria with progressive renal dysfunction due to renal vasculature damage.

One of the most common causes renal failure is hypertension.

Malignant (Accelerated) hypertension:

In which the patient get accelerated vascular damage characterized by fibrinoed necrosis of small arteries and arterioles associated with progressive end organs damage. So the patient present with hypertension associated with Gill or GIV hypertensive retinopathy, left ventricular failure with hypertensive encephalopathy and the patient gets proteinuria with progressive renal dysfunction.

Investigations:

Routine investigations for each hypertensive patient include:

1. GUE for proteinuria and glucose.
2. Blood urea, serum creatinine and serum electrolytes.
3. Blood sugar.
4. Serum cholesterol or lipid profile.
5. ECG to see evidence of left ventricular failure or CAD.

Other investigations needed to be done if :

a. Secondary hypertension is suspected.
b. Patients are unable to control blood pressure.
c. There are signs and symptoms suggestive of secondary cause and to look for evidence of complications.
d. The patient younger than 30 years old.

These investigations include:

1. CXR to see if there is evidence of heart failure, aortic aneurysm or Coarctation of aorta.
2. Echocardiography.
3. Abdominal U/S for the kidneys.
4. Renal angiography if renal artery stenosis is suspected.
5. Urinary catecholamine if pheochromacytoma is suspected.

6. Urinary cortisol level and bexamethazone suppression test if Cushirig’s is suspected.
7. Serum rennin and aldosterone if Conn’s disease is suspected.