# **Hypertension**

The risk of cardiovascular diseases such as stroke and CAD is closely related to levels of BP.

The cardiovascular risks associated with high BP depend on the combination of risk factors such as age, sex, weight, physical activity, smoking, family history, serum cholesterol, diabetes mellitus and pre-existing vascular disease

### **Definition of hypertension**

Category	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)			
Blood pressure					
Optimal	<120	< 80			
Normal	<130	85			
High normal	130-139	85-89			
Hypertension					
Grade 1 (mild)	140-159	90-99			
Grade 2 (moderate)	160-179	100-109			
Grade 3 (severe)	≥ 180	> 110			
Isolated systolic hypertension					
Grade 1	140-159	< 90			
Grade 2	≥ 160	< 90			

### **Pathogenesis**

Many factors may contribute to the regulation of BP:

Renal function, peripheral resistance, vessel tone, endothelial dysfunction, autonomic tone, insulin resistance, neurohumoral factors

### **Risk factors**

Age, high salt intake, heavy consumption of alcohol, obesity and lack of exercise, Impaired intrauterine growth and low birth weight

In about 5% of cases, hypertension is secondary to a specific disease

### **Cause of secondary hypertension**

#### Alcohol

#### Obesity

### Pregnancy

#### Renal disease

 Parenchymal renal disease. particularly glomerulonephritis

### Endocrine disease

- Phaeochromocytoma
- Cushing's syndrome
- Primary hyperaldosteronism (Conn
  Congenital adrenal hyperplasia due to syndrome)
- Glucocorticoid-suppressible hyperaldosteronism
- Hyperparathyroidism
- Acromegaly

#### Drugs

Coarctation of the aorta

- Renal vascular disease
- Polycystic kidney disease
  - Primary hypothyroidism
  - Thyrotoxicosis
    - 11β-hydroxylase or 17α-hydroxylase deficiency
  - Liddle syndrome
  - 11β-hydroxysteroid dehydrogenase deficiency

### How to measure blood pressure

- Use a machine that has been validated, well maintained and properly calibrated
- Measure sitting BP routinely, with additional standing BP in older and diabetic patients and those with possible postural hypotension; rest the patient for 2 minutes
- Remove tight dothing from the arm.
- Support the arm at the level of the heart
- Use a cuff of appropriate size (the bladder must encompass more than twothirds of the arm)
- Lower the pressure slowly (2mmHg per second)
- Read the BP to the nearest 2 mmHq
- Use phase V (disappearance of sounds) to measure diastolic BP
- Take two measurements at each visit

### **Clinical features**

Hypertension is usually asymptomatic until the diagnosis is made at a routine physical examination or when a complication arises.

1 .Sometimes clinical features may be observed that can give a clue to the underlying cause of hypertension . These include

Radio-femoral delay in patients with coarctation of the aorta. Enlarged kidneys in patients with polycystic kidney disease. Abdominal bruits that may suggest renal artery stenosis.

The characteristic facies and habitus of Cushing's syndrome.

- 2.Examination may also reveal evidence of risk factors for hypertension, such as central obesity and hyperlipidemia.
- 3.Other signs may be observed that are due to the complications of hypertension. These include signs of left ventricular hypertrophy, accentuation of the aortic component of the second heart sound, and a fourth heart sound.

### **Investigations**

## The objectives of investigations:

Confirm diagnosis

Identify contributing factors & any underlying cause

Assess other risk factors & quantify CV risk

Detect any complications that are already present

Identify comorbidity that may influence choice of antihypertensive therapy

### <u>Investigations ( to all patients )</u>

Urinalysis for blood, protein &glucose.

Blood urea, creatinine & electrolytes.

( Hypokalemia in hyperaldosteronism & diuretics ).

Blood glucose

Serum total & HDL cholesterol.

Thyroid function tests.

12 lead ECG (Left vent. hypertrophy LVH, CAD).

### **Specialized investigations ( NOT for all patients )**

Chest X ray: cardiomegaly, heart failure, coarctation of the aorta.

Echocardiography: (?LVH)

Renal ultrasound

Renal angiography: ? Renal artery stenosis.

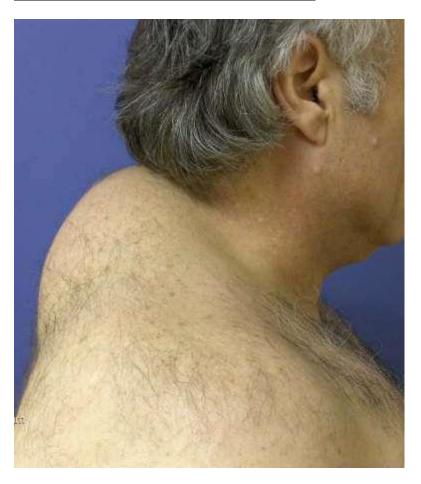
Urine chromatography: ? Pheochromocytoma.

Urine cortisol & dexamethasone suppression test : ? Cushing syndrome .

Plasma renin activity & aldosterone : Aldosteronism



# Buffalo hump in cushing syndrome



Xanthelasma in hyperlipidemia



### Chronic Kidney Disease ( Uremia )



ECG of LVH – Deep S in V 1, Tall R in V 6 // st depression & T inversion in Lead I, aVL, V 5 & V6

