Lec.1

Stage: 4

Hypertension

The practical definition of hypertension is 'the level of BP at which the benefits of treatment outweigh the costs and hazards'.

Blood pressure values are determined **by mechanical**, **hormonal and environmental factors**. Systemic BP rises with age, and the incidence of cardiovascular disease (particularly stroke and coronary artery disease) is closely related to average BP at all ages, even when BP readings are within the so-called "normal range".

The cardiovascular risks associated with BP depend upon the combination of risk factors in an individual, such as;

- \rm \rm age,
- \rm \rm gender,
- \rm weight,
- physical activity,
- **4** smoking,
- 4 family history,
- **4** serum cholesterol,
- 4 diabetes mellitus and
- **4** pre-existing vascular disease.

	Systolic BP	Diastolic BP
Category	(mmHg)	(mmHg)
BP		
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 hyperte	ension	
Grade 1	140-159	< 90
Grade 2	≥ 160	< 90

Aetiology

In more than 95% of cases, a specific underlying cause of hypertension cannot be found. Such patients are said to have essential hypertension. The pathogenesis is not clearly understood.

In about 5% of cases, hypertension can be shown to be a consequence of a specific disease or abnormality leading to sodium retention and/or peripheral vasoconstriction secondary hypertension.



Many factors may contribute to its development, including:

- + renal dysfunction,
- **4** Peripheral resistance vessel tone,
- 4 endothelial dysfunction,
- 4 autonomic tone,
- \rm insulin resistance and
- 4 neurohumoral factors.

Hypertension is more common in some ethnic groups, particularly African Americans and Japanese, and approximately 40–60% is explained by genetic factors.

Important environmental factors include

- 4 a high salt intake,
- heavy consumption of alcohol,
- \rm desity,
- \downarrow lack of exercise and
- **4** impaired intrauterine growth.

There is little evidence that 'stress' causes hypertension.

Approach to newly diagnosed hypertension

Hypertension is predominantly an asymptomatic condition and the diagnosis is usually made at routine examination or when a complication arises. A BP check is advisable every 5 years in adults.

The objectives of the initial evaluation of a patient with high BP readings are:

• to obtain accurate, representative BP measurements

• to identify contributory factors and any underlying cause (secondary hypertension)

• to assess other risk factors and quantify cardiovascular risk

• to detect any complications (target organ damage) that are already present

• to identify comorbidity that may influence the choice of antihypertensive therapy.

These goals are attained by:

- \checkmark a careful history,
- \checkmark clinical examination and
- $\checkmark\,$ some simple investigations.

Measurement of blood pressure

Measurements should be made to the nearest 2 mmHg, in the sitting position with the arm supported, and repeated after 5 minutes' rest if the first recording is high

To avoid spuriously high readings in obese subjects, the cuff should contain a bladder that encompasses at least two-thirds of the arm circumference.



This cuff is the right size around the arm, but it's too narrow for the length of the arm.

It should be 2/3 the length from elbow to shoulder



History

Family history, lifestyle (exercise, salt intake, smoking habit) and other risk factors should be recorded. A careful history will identify those patients with drug- or alcohol-induced hypertension and may elicit the symptoms of other causes of secondary hypertension, such as pheochromocytoma-**Small** vascular tumor of adrenal medulla causing irregular secretion of epinephrine and norepinephrine, leading to attacks of raised blood pressure, palpitations, and headache - (paroxysmal headache, palpitation and sweating) or complications such as coronary artery disease (e.g. angina, breathlessness).

Examination

Radio-femoral delay (coarctation of the aorta; see Fig.18.97, p. 632), enlarged kidneys (polycystic kidney disease), abdominal bruits (renal artery stenosis) and the characteristic facies and habitus of Cushing's syndrome are all examples of physical signs that may help to identify causes of secondary hypertension

Examination may also reveal features of important risk factors, such as central obesity and hyperlipidemia (tendon xanthomas and so on). Most abnormal signs are due to the complications of hypertension.

Nonspecific findings include:

- 1- left ventricular hypertrophy (apical heave),
- **2-** accentuation of the aortic component of the second heart sound, and a fourth heart sound.
- 3- Abnormal optic fundi
- 4- generalized atheroma
- 5- aortic aneurysm or
- **6** peripheral vascular disease

Target organ damage

The adverse effects of hypertension on the organs can often be detected clinically.

Blood vessels

In larger arteries (> 1 mm in diameter), the internal elastic lamina is thickened, smooth muscle is hypertrophied and fibrous tissue is deposited. The vessels dilate and become tortuous, and their walls become less compliant.

In smaller arteries (< 1 mm), hyaline arteriosclerosis occurs in the wall, the lumen narrows and aneurysms may develop. Widespread atheroma develops and may lead to coronary and cerebrovascular disease, *particularly if other risk factors (e.g. smoking, hyperlipidaemia, diabetes) are present.*

These structural changes in the vasculature often perpetuate and aggravate hypertension by increasing peripheral vascular resistance and reducing renal blood flow, thereby activating the renin–angiotensin–aldosterone axis (p. 547).

Hypertension is a major risk factor in the pathogenesis of aortic aneurysm and aortic dissection.

Central nervous system

Stroke is a common complication of hypertension and may be due to cerebral hemorrhage or infarction. Carotid atheroma and TIAs (transient ischemic attacks) are more common in hypertensive patients. Subarachnoid hemorrhage is also associated with hypertension.

Hypertensive encephalopathy is a rare condition characterized by high BP and neurological symptoms, including transient disturbances of speech or vision, paresthesia, isorientation, fits and loss of consciousness. Papilledema is common.

A CT scan of the brain often shows hemorrhage in and around the basal ganglia; however, the neurological deficit is usually reversible if the hypertension is properly controlled.

Retina

The optic fundi reveal a gradation of changes linked to the severity of hypertension; fundoscopy can, therefore, provide an indication of the arteriolar damage occurring elsewhere

((The **fundus** of the eye is the interior surface of the eye opposite the lens and includes the retina, **optic** disc, macula, fovea, and posterior pole))

.....To be continued