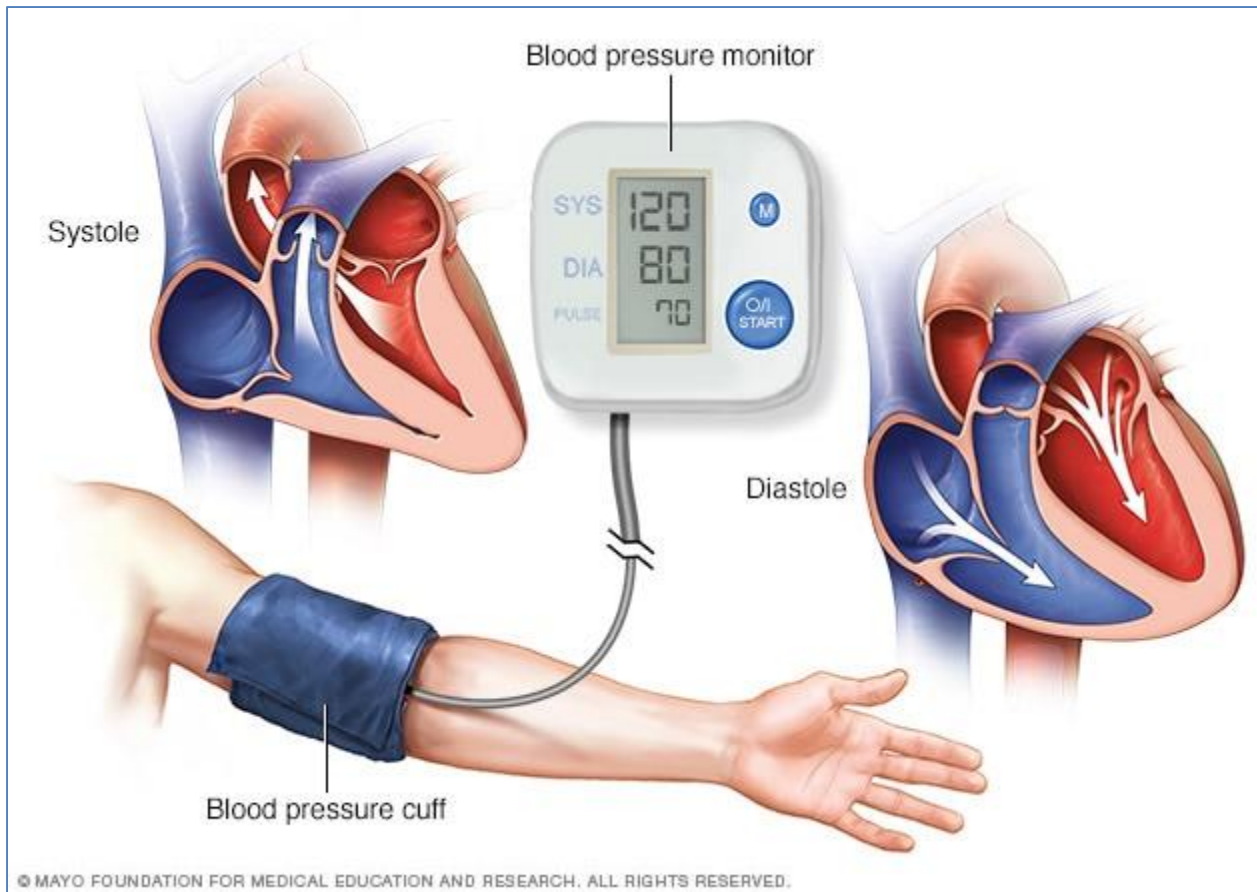




# **HYPERTENSIVE VASCULAR DISEASE**

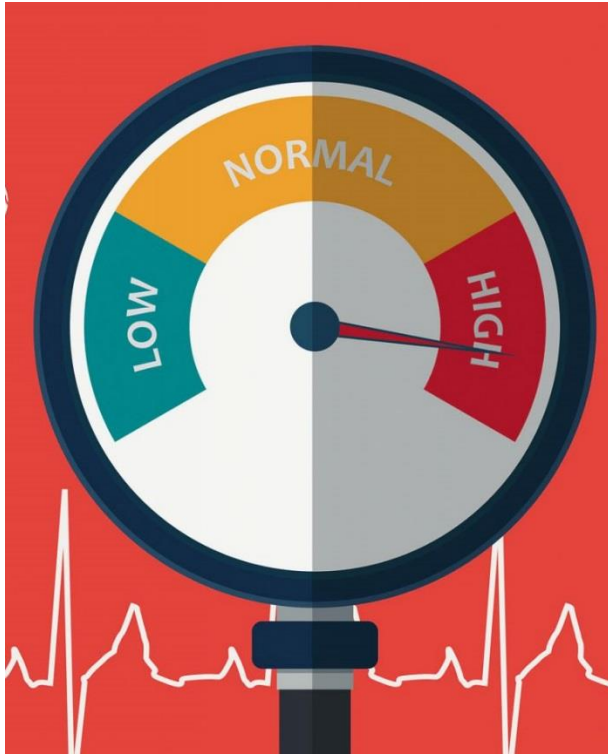
## **Arteriolosclerosis**

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A sphygmomanometer or a Digital blood pressure monitor is used to measure BP.

# Blood pressure



- Currently, cutoffs in diagnosing hypertension in clinical practice:  
sustained diastolic pressures **>80** mm Hg,  
and/or sustained systolic pressures **>130** mm Hg

# Types of hypertension

- According to severity:

Benign (95%) versus malignant (5%)

- According to cause:

Primary (essential) (95%) versus secondary (5%)

- According to side of circulation:

Systolic vs diastolic

- ***Malignant hypertension***

- 5% (also known as accelerated HTN)

- a rapidly rising blood pressure that, if untreated, leads to death within 1 to 2 years

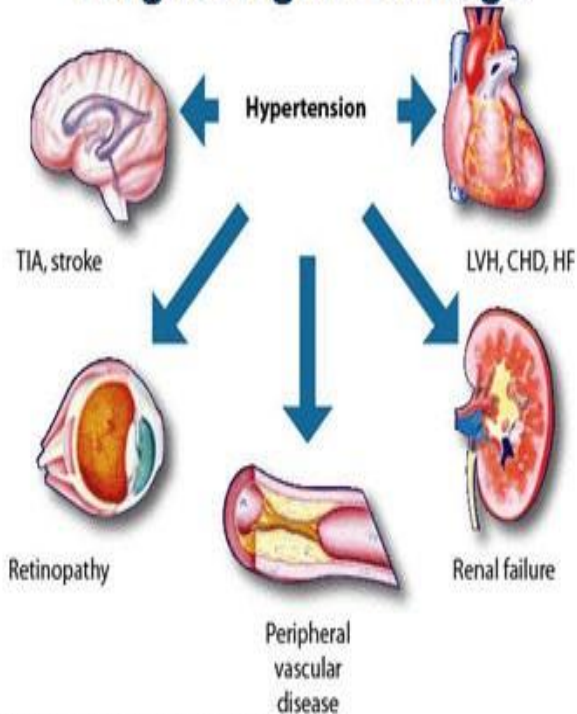
- **systolic pressures > 200 mm Hg or diastolic pressures > 120 mm Hg**

- renal failure and retinal hemorrhages

- usually superimposed on preexisting benign hypertension (either essential or secondary)

# Hypertension (HTN) has the following potential complications:

## Complications of Hypertension: Target-Organ Damage



TIA, transient ischemic attack; LVH, left ventricular hypertrophy; CHD, coronary heart disease; HF, heart failure

medscape

- stroke (CVD) & multi-infarct dementia
- atherosclerotic coronary heart disease
- cardiac hypertrophy and heart failure (*hypertensive heart disease*)
- aortic dissection
- renal failure
- retinal hemorrhages

# Types of hypertension- according to etiology

1- **essential (idiopathic) hypertension (95%)**

2- **secondary hypertension:**

**Most common:** renal disease or renal artery narrowing (**renovascular hypertension**)

**Other less common:** many other conditions....



## Essential Hypertension

Accounts for 90% to 95% of all cases

Most common of all

## Secondary Hypertension

### Renal

Acute glomerulonephritis

Chronic renal disease

Polycystic disease

Renal artery stenosis

Renal vasculitis

Renin-producing tumors

Most common of secondary causes

### Endocrine

Adrenocortical hyperfunction (Cushing syndrome, primary aldosteronism, congenital adrenal hyperplasia, licorice ingestion)

Exogenous hormones (glucocorticoids, estrogen [including pregnancy-induced and oral contraceptives], sympathomimetics and tyramine-containing foods, monoamine oxidase inhibitors)

Pheochromocytoma

Acromegaly

Hypothyroidism (myxedema)

Hyperthyroidism (thyrotoxicosis)

Pregnancy-induced (pre-eclampsia)

### Cardiovascular

Coarctation of aorta

Polyarteritis nodosa

Increased intravascular volume

Increased cardiac output

Rigidity of the aorta

### Neurologic

Psychogenic

Increased intracranial pressure

Sleep apnea

Acute stress, including surgery





# • *Pathogenesis of essential HTN*

## • ? Genetic factors

### ? familial clustering of hypertension

- angiotensinogen **polymorphisms** and angiotensin II receptor variants; polymorphisms of the renin-angiotensin system.
- ? **Susceptibility** genes for essential hypertension: genes that control renal sodium absorption, etc...

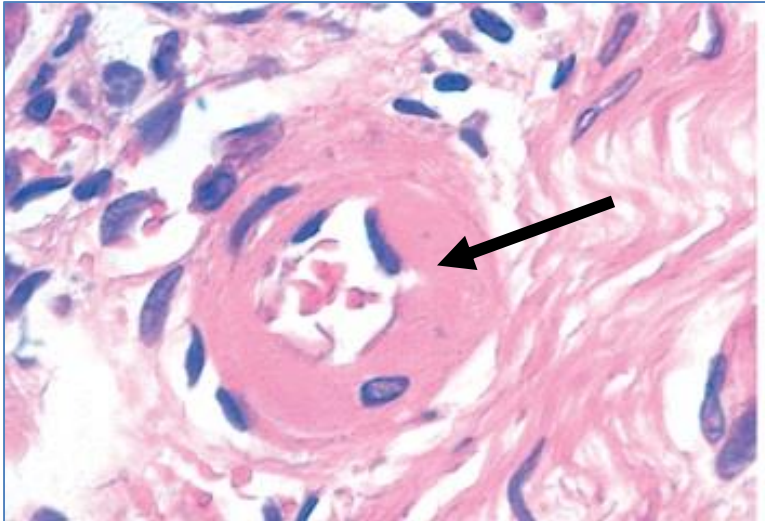
## • **Environmental factors** modify the impact of genetic determinants

stress, obesity, smoking, physical inactivity, ↑ salt consumption

# Blood vessels in HTN- Morphology

- HTN is associated with **arteriolosclerosis** (small arterial disease)
- Two forms of small blood vessel disease are hypertension-related:
  - 1- **hyaline arteriolosclerosis**
  - 2- **hyperplastic arteriolosclerosis**

# 1- Hyaline arteriolosclerosis



- Ass. with benign hypertension
- homogeneous **pink** hyaline thickening of arteriolar walls
- luminal narrowing
- leakage of plasma components across injured endothelial cells into vessel walls
- increased ECM production by smooth muscle cells in response to chronic hemodynamic stress

- **Hyaline arteriolosclerosis: Complications**

- **Most significant in kidneys → nephrosclerosis (glomerular scarring)**

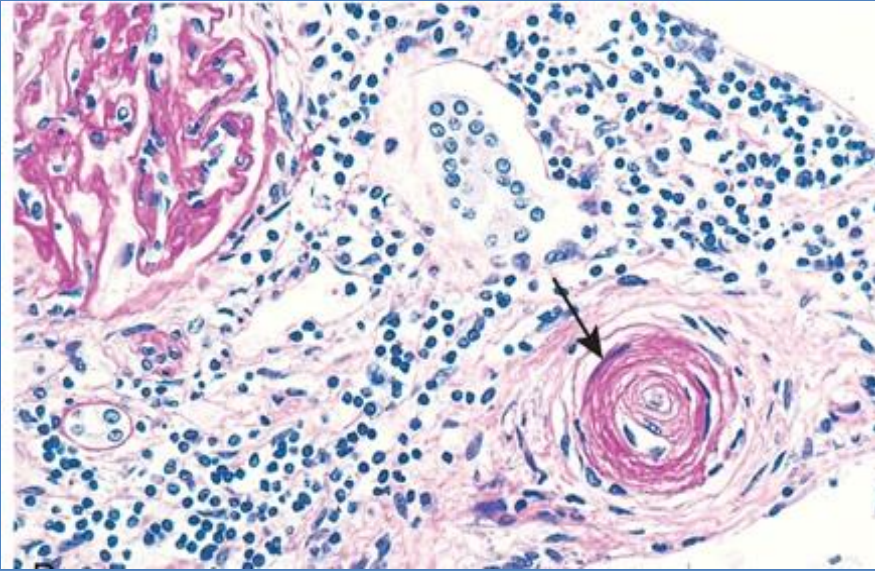
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- Other causes of **hyaline** arteriolosclerosis:

- 1- elderly patients (normo-tensive)**

- 2- diabetes mellitus**

## 2- Hyperplastic arteriolosclerosis



- With severe (malignant) hypertension
- "onionskin" concentric laminated **thickening** of arteriolar walls
- luminal narrowing
- reduplicated basement membrane
- fibrinoid vessel wall necrosis (necrotizing arteriolitis)

Fibrinoid Necrosis - artery

