HYPERTENSIVE VASCULAR DISEASE

Arteriolosclerosis

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

- 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

### Secondary Hypertension

#### Renal
- Acute glomerulonephritis
- Chronic renal disease
- Polycystic disease
- Renal artery stenosis
- Renal vasculitis
- Renin-producing tumors

#### 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

Most common of all

Most common of secondary causes
• **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)

• Other causes of **hyaline** arteriolosclerosis:
  1- elderly patients (normo-tensive)
  2- diabetis 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)*