Hypertension

Definition

* 1. Cardiac Diastole relaxation
  2. Cardiac Systole contraction
  3. Systolic Blood Pressure more important predictor of CVD
  4. Diastolic Blood Pressure
  5. Hypertension
  6. Pulse Pressure = systolic BP – diastolic BP predict CVD
  7. Mean Arterial Pressure = 1/3 systolic + 2/3 diastolic
  8. Total Peripheral Resistance sum of the resistance of all peripheral vasculature in the systemic circulation
  9. Cardiac Output = Stroke volume \* Heart Rate = volume pumped out / unit of time
  10. Stroke Volume = diastolic – systolic (amount of blood pushed out of heart)
  11. Heart Rate
  12. Cardiac Preload and Afterload pressure

Epidemiology

1. Affects 72 million Americans out of 300 million 🡪 31% of Adult population
2. 1 billion world wide

General:

1. Coronary Heart Disease
   1. #1 for MI heart attack 🡪 not enough O2
   2. angina
2. #2 for kidney failure
3. Cardiovascular disease
   1. HTN

Natural Regulation of BP

1. Humoral mechanism
   1. ANF peptide natiuretic hormone 🡪 increase BP
   2. Hyperinsulinemia increase BP
   3. RAS Renin-Angiotensin-Aldosterone System
2. Neural Components
   1. Adrenergic
      1. vessels alpha-1
      2. Heart Beta 1 🡪 increase HR 🡪 BP
      3. Lungs Beta 2 🡪 vasodilation
   2. CNS alpha 2 🡪 methyl-dopa
   3. Baroreceptors
3. Vascular Endothelium

**Vasoconstrictors**

Angiotensin II

Endothelin I

**Vasodilator**

Prostacyclin

Bradykinin

Nitric Oxide

Etiology 🡪 Origination

1. Primary: Unknown 90-95% of case
2. Secondary: Can Identify
   1. Sleep Apnea
   2. Cushings Syndrome
   3. Thyroid Disorders
   4. Hyperparathyroidism
   5. Primary aldosteronism
   6. Chronic Kidney Disease
   7. Pheochromocytoma (adrenal tumor excess catecholamine)
   8. Coarctation of the Aorta (anatomical abnormal in aorta artery requires surgery)

Drug Induced Hypertension

* + 1. Estrogens/Oral Contraceptives
    2. Adrenal Steroids (ie prednisone, fludrocortisones)
    3. Amphetamines/Cocaine
    4. Oral decongestants/Anorectics (pseudophedrine, ephedra)
    5. NSAIDS (how?)
    6. MAO Inhibitors with tyramine containing foods
    7. Venlafaxine Depression
    8. Erythropoietin control RBC
    9. Cyclosporine and Tacrolimus (how?)
    10. Ethanol
    11. Dietary Supplements, ie Ephedra, Ma Huang