Hypertension

- What is Blood Pressure?
- Diagnosis
  - Two or more elevated blood pressure readings, supine and sitting on at least two separate occasions.
  - Systolic and/or Diastolic is elevated.
- Clinical Manifestations
  - Mostly asymptomatic (Therefore known as the “silent killer”)
  - Can have headache (especially early morning headache)
  - Blurred vision
  - Spontaneous nosebleed
- Pathophysiology
  - Hyperactivity of the Sympathetic Nervous System
    - Baroreceptors in the aortic arch and carotid sinus signal the SNS via the CV control center in the medulla
      - $\Rightarrow \uparrow$ HR, CO, and vasoconstriction
    - Brain alerts the adrenal glands
      - Adrenals secrete catecholamines – epinephrine and norepinephrine
      - Neurotransmitters bind to alpha 1 receptors in blood vessels which causes constriction and beta 1 receptors in heart which causes increased HR. Net result is HTN
  - Hyperactivity of the Renin -Angiotension - Aldosterone System
    - Decreased BP cause kidneys to secrete Renin
    - Renin forms Angiotension I
    - Angiotension I converts to Angiotension II
    - Angiotension II signals Adrenals to secrete aldosterone which cause Na+ and H20 retention
    - Net result is HTN
  - Endothelial dysfunction
    - Inner layer of blood vessels (endothelium) is damaged preventing the vessel from dilating
    - Net result is HTN
- Hypertension
  - Primary
  - Secondary
- Who is at Risk?
  - Non Modifiable Risk Factors
    - Age – 60 years or greater
    - Male
    - African American
    - Postmenopausal
    - Hx DM, Hyperlipidemia
    - Positive family Hx
  - Modifiable Risk Factors
    - Obesity
    - Smoking
    - Sedentary lifestyle
    - Excessive sodium and alcohol intake
- Chronic Stress
- Atherosclerosis

- Nursing Diagnosis
  - Knowledge Deficit
  - Noncompliance with therapeutic regime
  - Others?

- Risk Reduction
  - Obesity → Weight loss
  - Smoking → Smoking cessation
  - Sedentary lifestyle → Increase Activity
  - Excessive sodium and alcohol intake → 2 – 4 Gm day / I serving day
  - Chronic Stress → Stress management

- Cigarette Smoking
  - Causes direct vasoconstriction of blood vessels and significantly increases the blood pressure, thereby counteracting the benefit of antihypertensive therapy.
  - Smoking Cessation
    - “Research shows that nurses are very effective at helping people stop smoking.

- Medications
  - Diuretics
  - ACE Inhibitors
  - Angiotension II Receptor Blockers
  - Calcium Channel Blockers
  - Adrenergic Blockers: Alpha Adrenergic Blockers
  - Adrenergic Blockers: Beta Adrenergic Blockers
  - Centrally Acting Adrenergics

- Medications
  - Diuretics and Beta blockers commonly prescribed for uncomplicated Stage I and II HTN
  - Other categories commonly prescribed if first line drugs are ineffective or contraindicated.
  - Often two or more medications are needed.

**Hyperlipidemia**
- Increased lipids in the blood.
- The combination of Diabetes Mellitus, Hypertension, and Hyperlipidemia is called Metabolic Syndrome.
- Cholesterol
  - Total Cholesterol
  - LDL Cholesterol
  - HDL Cholesterol

- Heart Attack Risk - LDL
- Heart Attack Risk - HDL
- HDL – the higher the better!!
- The higher the HDL is the lower your risk of heart disease is!!
- An HDL below below 40 is a definite risk factor for heart attack

- The ratio of total cholesterol to HDL cholesterol should be 3 to 1 or better.
- Heart Attack Risk - HDL
  - Total of 195 – you need an HDL of 65 to have a 3 to 1 ratio.
  - Total of 150 – an HDL of 50 is fine.

- Cholesterol Quiz
  - Total 251
  - HDL 91
  - LDL 159
  - No risk factors

- Cholesterol Quiz
  - Total 300
  - HDL 60
  - LDL 230
  - Diabetic, Obese, HTN 168/90
  - Age 55

- What can you do?
  - To learn how you can raise your HDL and lower you Total Cholesterol visit [www.BoeingWellness.com](http://www.BoeingWellness.com)
  - Click on Diseases and Conditions tab
  - Look for “High Cholesterol” under Diseases and Conditions A – Z.

- Cholesterol Reducing Medications
  - HMG CoA reductase inhibitors
    - “Statins” – Inhibits enzyme necessary in cholesterol synthesis
  - Bile Acid Sequestrants
    - Bind cholesterol in GI tract
  - Nicotinic Acid
    - Decreases hepatic lipoprotein synthesis
  - Fibric Acids
    - Inhibits peripheral lipolysis

**Chronic Arterial Occlusive Disease**

- Commonly called Peripheral Vascular Disease (PVD)
  - Progressive narrowing, degeneration and obstruction from arteriosclerosis and atherosclerosis
  - Plaque lesions commonly at the point of bifurcation
  - Vessel is 70% occluded before sx
  - Clinical Manifestations
    - Intermittent claudication – classic symptom
    - Gravity improves perfusion
    - Rest ischemia - (severe disease)
    - Ischemic or arterial ulcers
      - Pale, round, painful
      - May be crusty
• Necrotic tissue may be present
• Hair loss
• Thick, brittle, slow growing nails
• Impaired motor function
  ▪ Skin shiny and taunt, dry and scaly
  ▪ Skin cooler than normal
  ▪ Paleness when elevated above heart level for 5 minutes
  ▪ Reactive hyperemia (rubor) when lowered

Diagnosis
  ▪ History and physical exam
  ▪ Ankle-brachial index
    ▪ Measures the difference in blood pressure and blood flow in upper and lower extremities – an objective measure of stenosis.

Treatment
  ▪ Lifestyle modifications
  ▪ Pharmacologic therapy
    ▪ Goal is to improve blood flow and prevent thrombus formation
    ▪ Vasodilators (not very effective)
    ▪ Blood viscosity reducing agents
      ▪ Trental
      ▪ Also increases erythrocyte flexibility
    ▪ Antiplatelet agents
      ▪ ASA
      ▪ Persantine
      ▪ Ticlid
        ▪ Inhibits formation of arterial thrombi

**Acute Arterial Occlusive Disease**
• Can occur in health or diseased artery
• Typically occurs suddenly without warning
• Embolus dislodges and travels
• Blood supply distal to obstruction is abruptly interrupted.
• Symptoms depend on location and size of obstruction and patency of surrounding vessels.
• Clinical Manifestations
  ▪ Six “P”s of neurovascular assessment
    ▪ Pain
    ▪ Pallor
    ▪ Pulselessness
    ▪ Paresthesia
    ▪ Paralysis
    ▪ Poikilothermia

Diagnosis
  ▪ History and physical assessment
  ▪ Ankle-brachial index
  ▪ Doppler ultrasonography
  ▪ Magnetic Resonance Imaging (MRI)
  ▪ Angiography

Medications
Goal is to dissolve the clot and prevent further clot formation

- Thrombolytic
  - Urokinase
- Anticoagulant therapy (short term)
  - Heparin
  - Coumadin (long term)

Deep Vein Thrombosis (DVT)

- Causes
  - Venous stasis
  - Damage to the endothelial lining of the vein
  - Hypercoagulopathy
- Clinical Manifestations
  - 50% of patients are asymptomatic
  - Local pain or tenderness
  - Unilateral swelling or edema
  - Local warmth, redness
  - Mild fever
  - Only 20% (30%) of patient’s have Homan’s sign
  - Venography - radiopaque dye injected and x-rayed for detection of DVT
  - Doppler Ultrasound – noninvasive hand held ultrasonograph that records anatomy, blood flow direction and blood flow velocity.
- Medications
  - Meds play a major role in prevention and treatment of DVT
  - Prevention
    - Heparin (IV or SC)
      - Inactivates clotting factors
      - Monitored by APTT
      - Therapeutic level is 1.5 – 2 times the control
    - Coumadin
      - Monitored by INR
      - Therapeutic level 2.0 - 3.0 for DVT
      - Monitored by Prothrombin Time
      - Therapeutic level is 1.5 – 2 X control
    - Low-molecular weight heparins (LMWH) administered SC
      - Lovenox

Venous Ulcers

- Develop from increased venous tension and valve incompetence
- Clinical Manifestations
  - Irregular margins
  - Surrounding skin is brown and brawny
  - Edema common
  - Venous Insufficiency
- Treatment of Venous Ulcers
  - Compression
  - Unna’s boot
  - Elastic stockings (Prevention)
  - Elevation
  - Topical Wound Care
  - Lifestyle management