Chapter 8
Cardiovascular System Diseases and Disorders

Anatomy and Physiology
- Cardiovascular system - heart, arteries, and veins with blood
- Heart is the size of a man’s fist
- Heart is four chambered and muscular

Diagnostic Tests
- Non-invasive procedures
  - Auscultation
  - Doppler
  - Electrocardiogram
  - Echocardiography
  - Ultrasound arteriography

- Cardiac Catheterization
  - Invasive procedure to determine oxygen content and blood pressure
- X-rays
  - To determine normal function of heart and vessels
Diagnostic Tests

- Common X-rays
  - Angiocardiography
  - Angiography
  - Venogram
- Blood Tests
- Enzymes including CPK, LDH

Common Diseases of the Cardiovascular System

- Diseases of arteries
  - Hypertension
    - Normal blood pressure is 120/80
    - Top number is systolic blood pressure measuring highest pressure in artery when ventricles contract

- Diseases of arteries
  - Hypertension
    - Indicator of development of cerebrovascular, cardiovascular, and kidney disease
    - Chronic disease
    - Leading cause of stroke and heart failure

- Risk factors
  - Heredity
  - Diet
  - Age
  - Obesity
  - Smoking
  - Stress and type A personality
Common Diseases of the Cardiovascular System

• Hypertension Treatment
  – Anti-hypertensive medications
  – Lifestyle changes
  – Low salt diet
  – Stress-reducing exercise
  – Smoking cessation
  – Diuretics

Common Diseases of the Cardiovascular System

• Arteriosclerosis and atherosclerosis
  – Loss of elasticity and thickening of artery wall
  – "Hardening of arteries" is a lay term
  – Deposits of fatty or lipid material in wall of artery is called plaque

Common Diseases of the Cardiovascular System

• Arteriosclerosis and atherosclerosis
  – Major areas affected by atherosclerosis
    – Coronary arteries
    – Cerebral arteries
    – Aorta
    – Peripheral arteries

Common Diseases of the Cardiovascular System

• Risk factors of atherosclerosis
  – Non-controllable factors
    • Heredity
    • Age
    • Sex
    • Diabetes

Common Diseases of the Cardiovascular System

• Diagnosis of atherosclerosis - blood pressure, arteriograms, X-rays, doppler
• Treatment administered for symptoms
• Bypass surgery of occluded arteries and plaque removal
Common Diseases of the Cardiovascular System

• Peripheral Vascular Disease (PVD)
  – Caused by atherosclerotic plaque in arteries supplying blood to legs
  – Intermittent claudication - muscle cramps that are relieved with rest and increase with activity

• Aneurysm
  – Weakening in wall of artery creating a bulge or rupture
  – Usually asymptomatic and discovered accidentally

• Coronary Artery Disease
  – Narrowing of arteries that supply blood to the myocardium
  – Single leading cause of death in United States
  – Commonly due to atherosclerosis

Common Diseases of the Cardiovascular System

• Peripheral Vascular Disease (PVD)
  – Treatment includes an endarterectomy
  – If necrosis occurs, amputation or resection may be necessary

• Aneurysm
  – Aorta is most common place
  – Treatment includes repairing aneurysm before rupture through resection and grafting

• Coronary Artery Disease
  – Progressive narrowing of vessels may lead to ischemia of the heart muscle and symptoms
  – Scar tissue replaces muscle
  – Occlusion may progress slowly or suddenly as result of a thrombus or embolus
Common Diseases of the Cardiovascular System

• Coronary Artery Disease
  – Death of heart muscle is called a myocardial infarction
  – Diagnosis is based on history, EKG, angiograms
  – Treatment is aimed at increasing blood flow or decreasing oxygen needs

Common Diseases of the Cardiovascular System

• Coronary Artery Disease
  – Angina is treated with vasodilators
  – Angioplasty
  – Coronary artery bypass graft (CABG)
  – Reduce atherosclerotic risk factors - diet, exercise, and no smoking

Diseases of the Heart

• Angina Pectoris
  – Chest pain
  – Lack of oxygen to heart
  – Sign of impending myocardial infarction
  – Treatment: decrease workload of heart and nitroglycerin

Diseases of the Heart

• Myocardial Infarction
  – Heart attack
  – Occurs when heart does not get enough oxygen

Diseases of the Heart

• Myocardial Infarction
  – Classic symptoms
    • Severe chest pain with diaphoresis and nausea
    • Referred pain to neck, arm, and jaw with discomfort similar to bad or unrelieved indigestion

Diseases of the Heart

• Myocardial Infarction
  – Treatment
    • Immediate attention to prevent shock
    • Relieve respiratory distress
    • Decrease workload
    • If cardiac arrest, CPR must be performed
Diseases of the Heart

• Myocardial Infarction
  – Treatment
    • Oxygen and pain medication
    • Medications to treat arrhythmias
    • "Clot busting" medications
    • Education needed on prevention by lifestyle changes: smoking cessation, diet, exercise

• Hypertensive Heart Disease
  – Result of long-term hypertension
  – Causes are disease or disorder causing chronic elevation in blood pressure
  – Treatment: treating cause of hypertension
  – Can only be controlled, not cured

• Rheumatic Heart Disease
  – Autoimmune disorder
  – Caused by streptococcal throat infection
  – All layers of heart and valves can be affected
  – Treatment: prevention and treatment of streptococcal infections
  – Rest during acute stage
  – Valve replacement to correct deformity

• Congestive Heart Failure
  – Heart fails to pump adequate blood supply
  – Develops slowly and increases the workload of heart
  – Symptoms
    • Gradual increase in dyspnea
  – Symptoms
    • Tachycardia
    • Tachypnea
    • Neck vein distention
Diseases of the Heart

• Congestive Heart Failure
  – Symptoms
    • Edema in ankles and lower legs
    • Right sided leads to congestion of liver and spleen
    • Left sided leads to congestion of lungs

Diseases of the Heart

• Congestive Heart Failure
  – Diagnosis: history and physical, chest X-ray, EKG
  – Treatment
    • Decrease workload
    • Diuretics

Diseases of the Heart

• Congestive Heart Failure
  – Treatment
    • Salt and fluid restrictions
    • Medications to strengthen and slow the heart such as digitalis

Diseases of the Heart

• Cardiomyopathy
  – Disease of heart muscle
  – Characterized by dilated, enlarged, thin, flabby heart muscle
  – Incurable leading to congestive heart failure, myocardial infarction and death

Diseases of the Heart

• Carditis
  – Inflammation of the heart such as pericarditis, myocarditis, endocarditis
  – Often secondary to respiratory, urinary tract, or skin infection
  – Treatment: rest, antibiotics, analgesics, and antipyretics

Diseases of the Heart

• Valvular Heart Disease
  – Malfunction of heart valves
  – Murmurs or abnormal heart sound
  – Causes
    • Congenital abnormalities or malformations
    • Rheumatic fever
    • Endocarditis
Diseases of the Heart

- **Arrhythmias**
  - Abnormal heart rhythm
  - Sinus rhythm is normal heart rhythm (60 to 120 beats per minute)
  - Fibrillation - wild and uncoordinated
  - Flutter - unusually fast heart rate (up to 350 beats per minute)

- **Heart block**: interruption in conduction system
  - Divided into first-, second-, or third-degree
  - Premature or early contractions (PVCs) may affect atria or ventricles
  - Treatment: unnecessary provided person is asymptomatic

Diseases of the Vein

- **Phlebitis**
  - Inflammation of superficial veins
  - Symptoms: pain, swelling, red-cord-like hardening along vein from injury toward heart

- **Deep Vein Thrombophlebitis**
  - Clotting in vessels of legs, thighs, and pelvis
  - Asymptomatic until embolization occurs
  - Risk factors: immobility, dehydration, varicose veins

- **Deep Vein Thrombophlebitis**
  - Treatment
    - Analgesics
    - Warm compresses
    - Elevation of area above heart level
    - Elastic stockings and exercise

- **Deep Vein Thrombophlebitis**
  - Treatment
    - Reduce clot and prevent embolization
    - Anticoagulants
Diseases of the Veins

• Varicose Veins
  – Dilated, tortuous, and elongated veins in legs
  – Causes: prolonged sitting, standing, pregnancy, and obesity

Diseases of the Veins

• Varicose Veins
  – Symptoms: leg fatigue and cramps, thickening veins, edema, and fluid
  – Treatment: elevate legs, walking, and use of support or elastic hose
  – Vein stripping

Trauma

• Hemorrhage
  – Abnormal loss of blood
  – Acute or chronic
  – Exsanguination: loss of circulating blood
  – Internal bleeding can lead to anemia or shock due to blood loss

Trauma

• Hemorrhage
  – Low-pressure vessels lead to petechiae or ecchymosis of purpura
  – High-pressure vessels leads to squirting of bright red blood

Trauma

• Shock
  – Extremely low blood pressure that leads to decreased tissue perfusion

Trauma

• Shock
  – Types of shock
    • Cardiogenic
    • Septic
    • Hypovolemic
    • Neurogenic
    • Anaphylactic
Trauma

• Shock
  – Symptoms
    • Facial pallor
    • Cool and clammy skin
    • Cyanosis
    • Tachycardia
    • Tachypnea

Trauma

• Shock
  – Symptoms
    • Altered mental status
    • Syncope
    • Unconsciousness
    • Oliguria
    • Anuria

Trauma

• Shock
  – Treatment
    • Rest in supine position
    • Warm and quiet
    • Elevate feet and legs above heart

Rare Diseases

• Malignant Hypertension
• Cor Pulmonale
• Raynaud’s Disease
• Buerger’s Disease
• Polyarteritis Nodosa