Chapter 47

Care of the Patient with a Cardiovascular or a Peripheral Vascular Disorder

The Heart

- About the size of a fist
- Located within the mediastinum
- Pumps approximately 1000 gallons of blood every day
- Divided into four chambers

Chambers of the Heart

- Right atrium
  - Receives deoxygenated blood from the body
  - Pumps blood to the right ventricle
- Right ventricle
  - Pumps blood into the pulmonary artery
- Left atrium
  - Receives oxygenated blood from the pulmonary vein
  - Pumps blood to the left ventricle
- Left ventricle
  - Pumps oxygenated blood to the body through the aorta
Valves of the Heart

- The tricuspid valve is located between the right atrium and right ventricle
- The pulmonary semilunar valve is located between the right ventricle and the pulmonary artery
- The bicuspid valve is located between the left atrium and left ventricle
- The aortic semilunar valve is located between the left ventricle and the aorta
- The opening and closing of the AV valves creates the characteristic "lubb," first heart sound
- The opening and closing of the semilunar valves creates the characteristic "dubb," or second heart sound

The Conduction System of the Heart

- Sinoatrial (SA) node—the pacemaker of the heart
- Atrioventricular (AV) node slows the impulse to allow the atria to fill the ventricles
- The AV node also serves as a secondary pacemaker
- The bundle of His
- Purkinje fibers

Coronary Blood Flow

- Blood enters coronary blood flow through the right and left coronary arteries
- Flows through coronary circulation
- Returns to systemic circulation via coronary veins
Diagnostic Tests

- A number of diagnostic tests are used to evaluate coronary function
  - Diagnostic imaging
  - Cardiac catheterization and angiography
  - Electrocardiography
  - Cardiac monitors
  - Thallium scanning
  - Echocardiography
  - Positron emission tomography
  - MUGA scan
  - Laboratory tests

Diagnostic Imaging

- Radiography
- Angiogram
- Aortogram

Cardiac Catheterization and Angiography

- An invasive procedure used to visualize the heart’s chambers, valves, great vessels, and coronary arteries
- Used to measure
  - Pressure within the heart
  - Blood-volume relationship to cardiac competence
- Valvular defects, arterial occlusion, and congenital anomalies are determined
Electrocardiography

- ECG or EKG
- A graphic study of the electrical activities of the myocardium to determine transmission of cardiac impulses through the muscles and conduction tissue

Cardiac Monitors

- Telemetry
- Exercise stress ECG, or stress test
- Thallium scanning
- Echocardiography
- PET scan
- MUGA scan

Laboratory Tests

- CBC
- PT/INR
- Erythrocyte sedimentation rate
- Serum electrolytes
- Serum lipids
- Arterial blood gases
- Serum cardiac markers
- B-type natriuretic peptide (BNP)
- Homocysteine
- C-reactive protein
Risk Factors for Cardiovascular Disease

Nonmodifiable Risk Factors
- Family
- Gender
- Age
- Ethnicity

Modifiable Risk Factors
- Smoking
- Hyperlipidemia
- Hypertension
- Diabetes mellitus
- Obesity
- Sedentary lifestyle
- Stress
- Psychosocial

Cardiac Dysrhythmias
- A dysrhythmia (or arrhythmia) refers to any cardiac rhythm that deviates from normal sinus rhythm
- Normal sinus rhythm
  - Rate: 60-100 bpm
  - P waves: precede each QRS complex (atrial depolarization)
  - P-R interval: interval between atrial and ventricular repolarization
  - QRS complex: ventricular depolarization
  - T wave: ventricular repolarization
  - Rhythm: regular
Cardiac Dysrhythmias cont’d

- Sinus tachycardia
- Sinus bradycardia
- Supraventricular tachycardia
- Atrial fibrillation
- Atrioventricular block
- Premature ventricular contractions
- Ventricular tachycardia
- Ventricular fibrillation

Angina Pectoris

- Refers to thoracic pain or choking caused by decreased oxygen of the myocardium
- Atherosclerosis of the coronary arteries is the most common cause
- Pain is the characteristic symptom of angina pectoris

Angina Pectoris cont’d

**Assessment**

- **Subjective data**
  - Patient reports of pain
  - Feeling of impending doom
- **Objective data**
  - Signs of pain
  - Increased pulse
  - Increased blood pressure
  - Increased respiratory rate
  - Anxiety
  - Diaphoresis
Angina Pectoris cont’d

Diagnostic Tests
- ECG may reveal ischemia and rhythm changes
- Exercise stress test may show ischemic changes
- Coronary angiography may show changes

Angina Pectoris cont’d

Medical Management and Surgical Interventions
- Antiplatelets
- Vasodilators
- Beta blockers
- Calcium channel blockers
- Nitrates
- Coronary artery bypass graft
- Percutaneous transluminal angiography

Angina Pectoris cont’d

Nursing Interventions
- Promote comfort
- Promote tissue perfusion
- Promote rest
- Reduce anxiety
- Promote feelings of well-being
- Provide patient education
Myocardial Infarction

- An occlusion of a major coronary artery or one of its branches with subsequent necrosis of myocardium caused by atherosclerosis or an embolus
- An asymptomatic MI may occur
- Pain is the leading symptom of MI
- Pain not relieved by nitroglycerin or rest

Myocardial Infarction cont’d

**Assessment**
- Pain (OPQRST)
- Tachycardia
- Weak pulse
- Hypotension
- Diaphoresis
- Vomiting
- Pale skin
- Labored respirations
- Cardiac dysrhythmias

Myocardial Infarction cont’d

**Diagnostic Tests**
- Troponin T
- Troponin I
- ECG
- 12-lead ECG
- Echocardiogram
- PET scan
- MUGA scan
Myocardial Infarction cont’d

Medical Management
- Focuses on preventing further tissue injury
- MONA
- Beta blockers
- Calcium channel blockers
- Fibrinolytics
- PTCA
- CABG
- "Time is muscle"

Nursing interventions
- Administer medications
- Avoid excess fatigue
- Assist with ADLs
- Encourage and provide education about cardiac diet
- Prevent complications
- Encourage patient to discuss feelings

Heart Failure
- When the heart has become unable to meet the metabolic demands of the body
- Patient may have
  - Left ventricular failure
  - Right ventricular failure
Heart Failure cont’d

Assessment
- Dyspnea
- Orthopnea
- Jugular venous distention (JVD)
- Fluid retention
- Ascites
- Peripheral edema
- Weight gain is the most sensitive indicator

Heart Failure cont’d

Diagnostic Tests
- CBC
- BMP
- BNP
- ABGs
- ECHO
- ECG
- MUGA

Heart Failure cont’d

Medical Management
- Loop diuretics
- Thiazide diuretics
- Nitrates
- Digoxin
- ACE inhibitors
- Beta blockers
- ARBs
- Diet
- Fluid restriction
- Oxygen
Heart Failure cont'd

Nursing Interventions
- Monitor vital signs
- Monitor fluid status
- Assess lung sounds
- Monitor urinary output
- Assess edema
- Assess for signs and symptoms of pulmonary edema

Valvular Heart Disease
- Stenosis
- Insufficiency

Valvular Heart Disease cont’d

Assessment
- Fatigue
- Weakness
- Pain
- Nocturnal dyspnea
- Orthopnea
- Crackles
- Edema
Valvular Heart Disease cont’d

Medical Management and Nursing Interventions
- Commissurotomy
- Valve replacement
- Assist with ADLs
- Administer prescribed medications
- Assess oxygenation status

Patient Teaching for Cardiac Disorders
- Diet
- Medications
- Procedures
- Rest
- Smoking cessation
- Exercise

Cardiac Rehabilitation
- Cardiac rehabilitation has two major parts
  - Exercise training to help the patient learn how to exercise safely, strengthen muscles, and improve stamina
  - Education, counseling, and training to help the patient understand his or her heart condition and find ways to reduce the risk of future heart problems
Pulmonary Edema

- The accumulation of extravascular fluid in lung tissues and alveoli, most often caused by heart failure (HF)
- An acute and extensive life-threatening complication of HF caused by severe left ventricular dysfunction

Pulmonary Edema cont'd

Clinical Manifestations and Medical Management
- Severe respiratory distress
- Pink sputum
- Frothy sputum
- For assessment see Box 47-5
- Diagnosed by radiograph of the chest
- Medical management involves simultaneous interventions to promote oxygenation, improve cardiac output, and reduce pulmonary congestion

Pulmonary Edema cont'd

Nursing Interventions
- Promote oxygenation
- Promote venous return to the heart
- Promote adequate respiration
- Monitor I&O
- Monitor electrolytes
Rheumatic Heart Disease

- Is a result of rheumatic fever
- Arises from group A or group B streptococcus infection
- Characterized by fever, epistaxis, tachycardia, and nodules on joints
- Assessment will reveal joint pain, chest pain, or other manifestations associated with complications
- Valvular manifestations will mimic valvular disease
- It is diagnosed through signs and symptoms and lab values

Medical Management

- Prevention is the best management
- NSAIDs
- Antibiotics
- If needed, valve repair or replacement

Nursing Interventions

- Promote rest as indicated by patient’s condition
- Administer prophylactic antibiotics as prescribed
- Provide patient education regarding dental procedures
Pericarditis

- Inflammation of the pericardium caused by bacteria, fungus, or virus
- Characterized by retrosternal chest pain that is worse when lying supine
- Chest pain should be thoroughly assessed
- Patient should be assessed for general aches and fatigue
- Diagnosis made through careful assessment and lab values
- The nurse should evaluate the patient and monitor vital signs
- Supportive care should be provided

Endocarditis

- Inflammation of the endocardium
- IV drug abusers are the most frequently affected
- Patient complains of flulike symptoms and chest pain, and may have splinter hemorrhages or petechiae
- Treatment involves rest and antibiotics
- Surgery may be required
- Nursing interventions are aimed at symptom control and promoting rest and comfort

Cardiomyopathy

- *Cardiomyopathy* is a term used to describe a group of heart muscle diseases that primarily affect the structural or functional ability of the myocardium
  - Dilated
  - Hypertrophic
  - Restrictive
Cardiomyopathy cont’d

Causes
- Infection
- Metabolic disorders
- Severe nutritional disorders
- Alcohol abuse
- Peripartal disorders
- Drugs
- Radiation therapy
- Lupus
- Rheumatoid arthritis
- Cocaine abuse

Clinical Manifestations
- The patient may have symptoms of heart failure, edema, or hepatic dysfunction
- Medical management includes ACE inhibitors, antidysrhythmics, or beta blockers
- Heart transplantation

Effects of Aging on the Heart
- Blood vessels become thicker and less compliant
- Peripheral vascular resistance increases, causing a rise in blood pressure
- Atherosclerotic changes in the blood vessels increase
Arterial Disorders Assessment

- Intermittent claudication
- Strength of pulses
- PATCHES mnemonic
  - Pulses
  - Appearance
  - Temperature
  - Capillary refill
  - Hardness
  - Edema
- Sensation

Venous Disorders Assessment

- Chronic edema
- Stasis ulcers
- Peripheral pulses are present

Hypertension

- Essential
- Secondary
- Malignant
Hypertension cont’d

- Essential hypertension (HTN)—there is no underlying cause
- Accounts for 90-95% of HTN cases
- Secondary HTN occurs as the result of a comorbidity
- Malignant HTN is a severe, rapidly progressive elevation in blood pressure that causes damage to the small arterioles in major organs

Hypertension cont’d

- Medical management
  - Medications
  - Lifestyle modification
  - Diet
  - Smoking cessation
  - Stress management
  - Treat underlying causes of secondary HTN

Arterial Aneurysm

- An aneurysm is an enlarged, dilated portion of an artery that exceeds 3 cm
- Aneurysms may be the result of arteriosclerosis, trauma, or a congenital defect
- Aortic aneurysms are most common in men in their 60s and 70s
- Other risk factors are smoking, hypertension, atherosclerosis, family history of aortic aneurysm, infarction, and trauma
Arterial Aneurysm cont’d

Clinical Manifestations and Diagnostic Exams
- Palpating mass in the abdomen
- Chest pain
- Shortness of breath
- Dysphagia
- Pain in lower back or anus
- Diagnosed with CT scan, X-ray, Aortograph, MRI

Arterial Aneurysm cont’d

Medical Management and Nursing Interventions
- Control hypertension
- Graft
- Removal of aneurysm
- The nurse should monitor patient status and report changes quickly
- Treat anxiety
- Treat pain
- Report sudden changes to the provider rapidly

Buerger’s Disease
- Thromboangiitis obliterans (Buerger’s disease) is an occlusive vascular condition in which the small- and medium-sized arteries become inflamed and thrombotic
- Most often affects men ages 25-40 who smoke
- Characterized by pain and sometimes ulceration
- There are no specific tests for this condition
- Treatment focuses mainly on modifying risk factors and stopping smoking
- Nursing interventions focus on managing risk factors and promoting circulation
Raynaud's Disease

- Caused by intermittent arterial spasms
- Raynaud's is either primary or secondary
  - Primary—the cause is not known and the condition is usually mild
  - Secondary—when symptoms occur as a result of other conditions
- The patient typically complains of cold hands and feet and may have discoloration
- Medical management is aimed at prevention
- Nursing interventions focus on promoting comfort and preventing the disease

Thrombophlebitis

- Inflammation of the vein with formation of a thrombus
- Pain and edema occur when the vein is occluded
- Active dorsiflexion of the foot may result in calf pain
- Diagnosed via ultrasound
- Treatment is anticoagulant therapy
- Nursing interventions are aimed at controlling pain and administering prescribed medications

Varicose Veins

- Tortuous, dilated veins with incompetent valves
- Poor posture, prolonged standing, and constrictive clothing are risk factors
- Often the only symptom is the appearance of darkened veins on the patient’s legs
- Patient should be assessed for predisposing factors and varicocities
- Controlled with elastic stockings, rest periods, and leg elevation
- Sclerotherapy
- Nursing interventions focus on care of the patient after a surgical procedure
Stasis Ulcer

- Ulcers occur from chronic deep vein insufficiency and stasis of blood in the venous system of the leg
- Patient may report varying levels of pain
- Obvious stasis ulcer on the leg
- Pedal pulses are present
- Diagnosis made via venography and ultrasound
- Management focuses on promoting wound healing and preventing infection
- Nursing interventions are aimed at promoting wound healing and providing patient education