UNIT IV

Problems with Cardiac and Tissue Perfusion

Objectives

- Review anatomy and physiology
- Identify
  - ECG
  - Echocardiogram
  - TEE
  - Persantine Thallium
  - Coronary angiogram

Objectives

- Discuss etiology, pathophysiology, clinical manifestation, complications, and collaborative management of:
  - Buerger’s Disease
  - Raynaud’s Disease
  - Acute Arterial Occlusion
  - Venous Insufficiency
Anatomy and Physiology

- Blood flow through heart
  - Superior + inferior vena cava
  - Right atrium
  - Tricuspid valve
  - Right ventricle
  - Pulmonic valve – lungs
  - Left atrium
  - Bicuspid (mitral) valve
  - Left ventricle
  - Aortic valve
  - Aorta

Arteries and Veins

- Smooth muscle of peripheral arteries control blood flow
- Vasoconstriction
- Vasodilation

ECG

- Graphic look at heart’s electrical activity
  - Normal conduction tracing
- Patients on telemetry have five leads
- Lead placement important
Stress ECG

- ECG to monitor cardiac response to an increased workload during progressive exercise.
- Workload increase q 3 min for 15 min
- Education

Echocardiogram

- Two dimensional
- Ultrasound
- Evaluates structure
- Evaluates function
- No special nursing considerations

Trans-Esophageal Echocardiogram

- Ultrasound
- Introduced probe into esophagus
- Visualizes back of heart
- Nursing:
  - Consent
  - VS
  - Pre-med
**Thallium Stress Test**
- Thallium 201 injected
- Stress test done
- Nuclear scan done 2-3 hrs later
- Nursing:
  - Consent
  - Assess medications
  - VS

**Persantine Stress Test**
- Patient not physically able to do stress test
- Persantine injected
- Arteries affected by CAD will not dilate
- Nursing:
  - Consent
  - NPO after MN
  - No caffeine x 24 hrs
  - Review meds

**Coronary Angiogram**
- Identify CAD or valve disease
- Determine pressures in PA or heart chambers
- Angioplasty
- Nursing:
  - Consent
  - NPO 6 - 8 hrs prior
  - Leg immobile for 6 - 8 hrs post procedure
  - Check pulses distal to site
Arteriogram

- Procedure similar as coronary angiogram
- Can visualize arteries in brain, kidney, extremities and many other parts of the body

Problems of Tissue Perfusion

Thromboangiitis Obliterans (Buerger's Disease)

- Definition
  - Inflammatory occlusions of distal arteries and veins
  - Relatively uncommon
  - Limited to medium + small arteries and veins
  - Disease of young men
  - 20-45 years of age
  - Smokers
  - Cause is unknown, may be genetic or autoimmune
Buerger’s Disease
Pathophysiology

- Inflammatory cells enter artery wall
- Thrombus formation
- Vasospasm
- Intermittent flare ups

Buerger’s Disease
Signs and Symptoms

- Claudication
- Tingling and numbness
- Persistent coolness
- Sensitivity to cold
- Reduced or absent arterial pulses
- Skin shiny
- Thickened nails
- Ulceration or gangrene - severe

Buerger’s Disease/Management

- Stop smoking
- Keep warm, avoid cold
- Prevent trauma
- Exercise
- Drug therapy
- Monitor peripheral pulses frequently
- May need arterial bypass surgery/amputation
- Sympathectomy
Buerger's Disease - Nursing Care
- Health promotion
- Relieve acute manifestations
- Foot care
- Post-surgical care

Raynaud's Disease
- Episodic vasospasms of the small arteries of the fingers and sometimes toes.
- Primarily young women

Raynaud's Disease
- Signs and Symptoms
  - Cold, numb (white and blue phase)
  - Pain and swelling (red phase)
  - Cyanosis
  - Fingertips thicken
  - Brittle nails
  - Ulcers, may progress to gangrene - seldom
Raynaud’s Disease/ Management

- Education
  - Stop smoking
  - Avoid cold, stress, keep warm
  - Exercise
  - Protect hands from injury (wounds heal slowly)
- Vasodilator drugs
- May require sympathectomy
- Supportive

Acute Arterial Occlusion

- Occurs suddenly – pain is predominant symptom
- Embolus or thrombus
- Most common - lower extremities
- Blood supply is interrupted.
- Causes: MI or A-fib, atherosclerosis
- Other causes:
  - Blunt trauma
  - Compartment syndrome

Thrombus/ Embolus

- Thrombus – blood clot that forms inside a blood vessel or cavity of the heart
- Embolus – debris that moves through the bloodstream until it lodges in a narrowed vessel and blocks circulation

- Thrombus
- Embolus
- Thrombus
- Embolus
Symptoms of Acute Arterial Occlusion

- “Six P’s” of ischemia
  - Pain
  - Pallor
  - Pulselessness
  - Paresthesia
  - Paralysis
  - Poikilothermia (coolness)

Diagnosis of Acute Arterial Occlusion

- Signs and symptoms
  - 6 “Ps”
  - Chest pain
  - SOB
- Diagnostic tests:
  - Arteriogram
  - CT if neuro
  - VQ scan

Complications of Acute Arterial Occlusive Disease

- Necrosis (tissue death)
- Gangrene
  - Can occur in a matter of hours
  - Complete loss of limb
Medical Management: Goal

- Avoid permanent damage or loss of an extremity
  - Anticoagulant – Heparin – Prevent further clot formation
  - Thrombolytic agent – Urokinase, Streptokinase, Activase–
    - monitor for bleeding, growing bruising/hematoma,
    - NOTIFY MD STAT

Heparin

- Can be given as IV bolus and IV drip
- Does nothing to the existing clot
- Used for large clots and pulmonary embolus (PE)
- Monitored by PTT (Therapeutic PTT is approx. 2 x normal control levels)
- Antidote=protamine sulfate

Thrombolitics

- t-PA (recombinant tissue plasminogen activator)
- Dissolves clots quickly and completely
- Must be initiated within 5 days after onset of symptoms
- Contraindicated if:
  - Post-op
  - Trauma
  - CVA
  - Neuro surgeries within last 2 months
  - Gastrointestinal ulcers
  - During pregnancy or after childbirth
**Long-term Anticoagulant Therapy**

- Warfarin (Coumadin)
  - Start while on heparin when switch to Coumadin to maintain therapeutic anticoagulation
  - Monitor PT/INR - therapeutic
    - INR 2.0 - 3.0 x normal INR for venous occlusions
    - INR 3.0 - 4.5 x normal INR for arterial thrombus
  - Dose will change to achieve therapeutic level
  - DVT patients can expect to stay on for 3-6 months
  - **Vitamin K is antidote for Coumadin**

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**Nursing Interventions for Anticoagulant Therapy**

- Monitor for bleeding
  - Hematuria,
  - frank or occult blood in stool
  - Bruising, petechiae,
  - altered mental status
  - abdominal pain
- VS for hypotension and tachycardia
- Have antidotes available
- Monitor lab work specific to therapy
- Prolonged pressure to venipuncture sites
- Pressure/no massage with subq heparin

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**Surgical embolectomy**

- Incision in artery
- Surgeon evacuates embolus
- Patch graft
Surgical Management
- Used to reverse ischemia when conservative methods fail
  - Thrombectomy
  - Embolectomy

Nursing Care Acute Arterial Occlusion
- Health history
- Physical examination
- Nursing diagnosis???

Chronic Venous Insufficiency
- Disorder of peripheral vascular system
- Interferes with circulation
- Cause is damaged valves in veins
Chronic Venous Insufficiency

- Skin changes
  - Brown/ brawny skin discoloration (pigmentation)
  - Ankle edema and stasis
  - Blistering
  - Dermatitis
  - Reddened or cyanotic
  - No claudication
  - Skin ulcers

Management

- Assess circulation
- Anti-embolism stockings
- Elevate legs at rest above the heart
- Slow steady walking
- Do not remain inactive
- Wound care
Chronic Venous Insufficiency

- Wound care nurse
  - Wet to dry
  - Hydrocolloid
  - Unna boot
- Debridement
  - Surgical
  - Accuzyme

Chronic Venous Insufficiency w DVT

- Venous pooling distal to the clot
- Swelling and inflammation
- Leading to signs and symptoms
  - Ankle edema
  - Skin changes
  - Stasis ulcers

Chronic Venous Insufficiency

- Nursing care:
  - Assess circulation
  - Elevate legs
  - Encourage exercise
  - TEDs
  - Skin care
  - Teach
Nursing Diagnosis

- Ineffective tissue perfusion
- Impaired skin integrity (or risk)
- Risk for infection
- Impaired physical mobility
- Ineffective health maintenance
- Disturbed body image

Case Study

- 75 y/o female c/o pain in rt leg x 1 week
- Seems larger than other leg and tender to touch
- Admitting r/o DVT – how diagnosed?
- Treatment?
- Nursing diagnosis?

Compare