
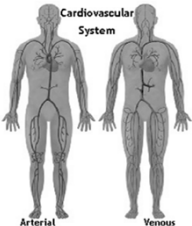


UNIT IV





Arterial Venous

Cardiovascular System

Problems with Cardiac and Tissue Perfusion

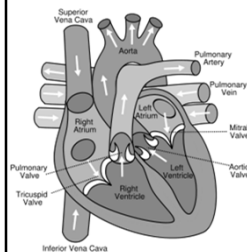
Objectives

- ▣ 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

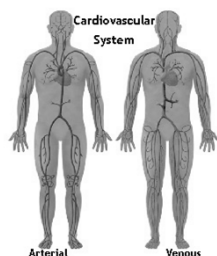


- ☐ Blood flow through heart
 - Superior + inferior vena cava
 - Right atrium
 - Tricuspid valve
 - Right ventricle
 - Pulmonic valve -lungs
 - Left atrium
 - Bicuspid (mitral) valve
 - Left ventricle
 - Aortic valve
 - Aorta

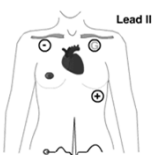
Arteries and Veins



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



ECG

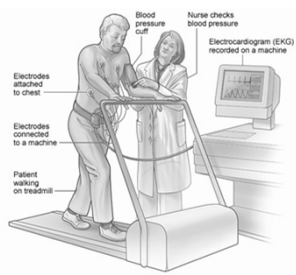


- ☐ Graphic look at heart's electrical activity
 - Normal conduction tracing
- ☐ Patients on telemetry have five leads
 - Lead placement important

WWW.RNCEUS.COM
Health Interactive © 1999



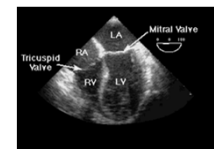
Stress ECG



Blood pressure cuff
 Nurse checks blood pressure
 Electrocardiogram (ECG) recorded on a machine
 Electrodes attached to chest
 Electrodes connected to a machine
 Patient walking on treadmill

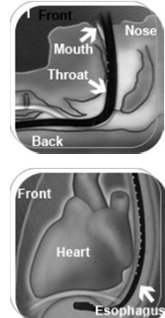
- ▣ ECG to monitor cardiac response to an increased workload during progressive exercise.
- ▣ Workload increase q 3 min for 15 min
- ▣ Education

Echocardiogram





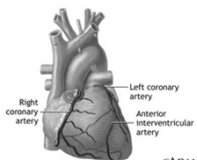
- ▣ Two dimensional
- ▣ Ultrasound
- ▣ Evaluates structure
- ▣ Evaluates function
- ▣ No special nursing considerations

Trans-Esophageal Echocardiogram




- ▣ Ultrasound
- ▣ Introduced probe into esophagus
- ▣ Visualizes back of heart
- ▣ Nursing:
 - Consent
 - VS
 - Pre-med

Thallium Stress Test

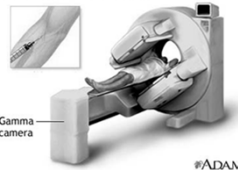
- ☐ Thallium 201 injected
- ☐ Stress test done
- ☐ Nuclear scan done 2-3 hrs later
- ☐ Nursing:
 - Consent
 - Assess medications
 - VS

Persantine Stress Test


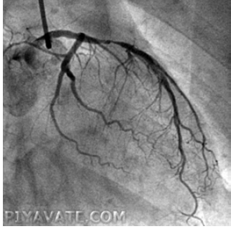


- ☐ Patient not physically able to do stress test
- ☐ Persantine injected
- ☐ Arteries affected by CAD will not dilate
- ☐ Nursing:
 - Consent
 - NPO after MN
 - No caffeine x 24 hrs
 - Review meds

The radiotracer, injected into a vein, emits gamma radiation as it decays. A gamma camera scans the radiation area and creates an image.



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

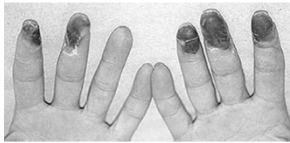
Arteriogram



- ❑ 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



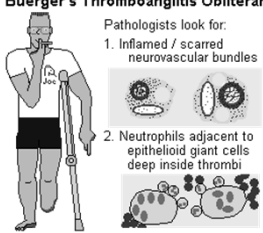
- Inflammatory occlusions of distal arteries and veins
- Relatively uncommon
- Limited to medium + small arteries and veins
- Disease of young men
- 20-45 years of age
- Smokers
- Cause is unknown, may be genetic or autoimmune

Buerger's Disease Pathophysiology

Buerger's Thromboangiitis Obliterans

Pathologists look for:

1. Inflamed / scarred neurovascular bundles
2. Neutrophils adjacent to epithelioid giant cells deep inside thrombi



- 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

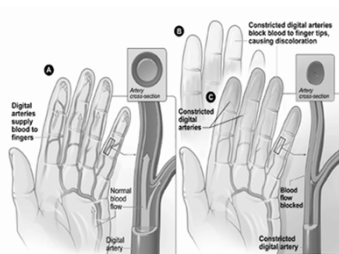
Buerger's Disease - Nursing Care

- ☐ Health promotion
- ☐ Relieve acute manifestations
- ☐ Foot care
- ☐ Post - surgical care

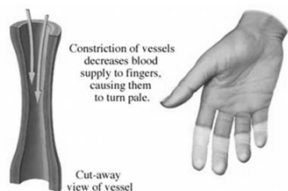


Raynaud's Disease

- ☐ 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

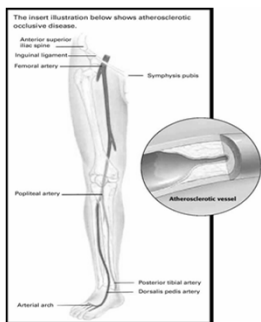
- ☐ Education
 - Stop smoking
 - Avoid cold, stress, keep warm
 - Exercise
 - Protect hands from injury (wounds heal slowly)
- ☐ Vasodilator drugs
- ☐ May require sympathectomy
- ☐ Supportive



©Mose Foundation for Medical Education and Research. All rights reserved.

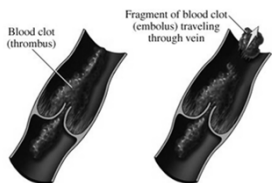
Acute Arterial Occlusion

- ☐ 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

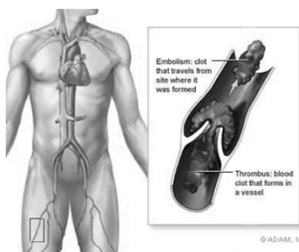


Symptoms of Acute Arterial Occlusion

- ☐ “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**

Thrombolytics

- ☐ 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

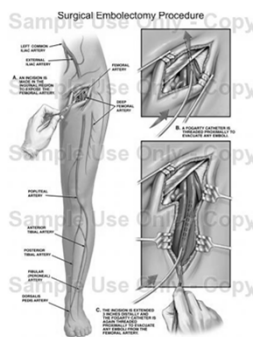
Long-term Anticoagulant Therapy

- ☐ 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

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

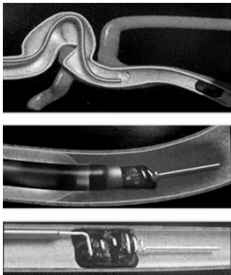
Surgical embolectomy



- ☐ Incision in artery
- ☐ Surgeon evacuates embolus
- ☐ Patch graft

Surgical Management

- Used to reverse ischemia when conservative methods fail
 - Thrombectomy
 - Embolectomy

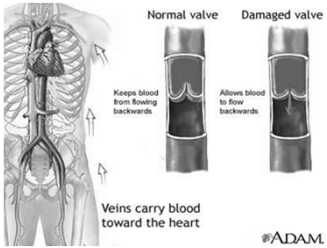


Nursing Care Acute Arterial Occlusion

- Health history
- Physical examination
- Nursing diagnosis???

Chronic Venous Insufficiency

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

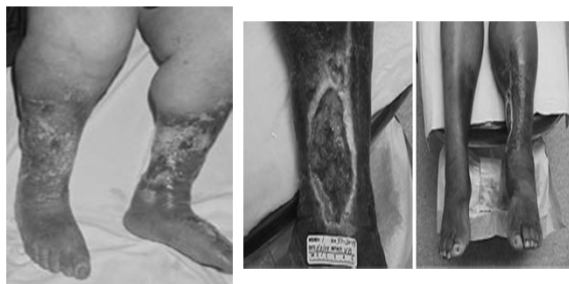


Chronic Venous Insufficiency

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

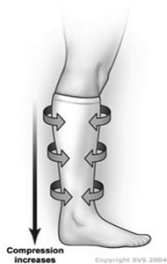


Chronic Venous Insufficiency

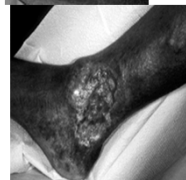
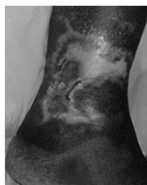


Chronic Venous Insufficiency

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



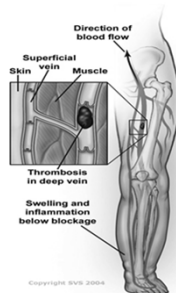
Chronic Venous Insufficiency



- ☐ 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