Peripheral Artery Disease of the Lower Extremities

- Progressive narrowing and degeneration of arteries of upper and lower extremities
- Atherosclerosis is leading cause in majority of cases
- PVD vs PAD

*What does this disease sound like and can you anticipate the interprofessional management (medical, nursing)*

Common Sites of Atherosclerotic Lesions

- Risk Factor:
  - Tobacco use
  - Chronic kidney disease
  - Diabetes mellitus
  - Hypertension
  - Hypercholesterolemia
  - Obesity
  - Sedentary Lifestyle

OXYGENATION NEEDS

- Ventilation
- Perfusion
- Diffusion

*What concept is involved?*
*Your patient is a scheduled admit who has had leg pain with activity and while at rest for 2 weeks, what is the plan of care?*
*What nursing physical assessments are involved?*
Audience Response Question

A patient with peripheral artery disease has marked peripheral neuropathy. An appropriate nursing diagnosis for the patient is
a. Risk for injury related to decreased sensation.
b. Impaired skin integrity related to decreased peripheral circulation.
c. Ineffective peripheral tissue perfusion related to decreased arterial blood flow.
d. Activity intolerance related to imbalance between oxygen supply and demand.

Clinical Manifestations

- “Intermittent claudication”
  - Ischemic muscle pain that is caused by a constant level of exercise
  - Resolves within 10 minutes or less with rest
  - Reproducible

- “Paresthesia”
  - Nerve tissue ischemia
  - Produces loss of pressure and deep pain sensations
  - Injuries often go unnoticed by patient

- “Pain” at rest
  - As PAD progresses
  - Occurs in feet or toes
  - Aggravated by limb elevation
  - Occurs from insufficient blood flow
  - Occurs more often at night

Clinical Manifestations

- Thin, shiny, and taut skin
- Loss of hair on lower legs
- Diminished or absent pedal, popliteal, or femoral pulses
- Pallor of foot with leg elevation
- Reactive hyperemia of foot with dependent position
Critical Limb Ischemia (CLI)

- Characterized by:
  - Chronic ischemic rest pain lasting more than 2 weeks
  - Arterial leg ulcers or gangrene
- Urgent/Emergent revascularization to save limb

*How will this be done?

Complications

- Atrophy of skin and underlying muscles
- Delayed healing, wound infection, tissue necrosis
- Arterial (ischemic) ulcers over boney prominences on toes, feet and lower legs
- Nonhealing arterial ulcers and gangrene are most serious complications
- May result in amputation
  - If adequate blood flow is not restored
  - Collateral circulation in chronic PAD
  - If severe infection occurs (osteomyelitis)

Diagnostic Studies

- Doppler ultrasound
- Ankle-brachial index (ABI)
- Angiography and magnetic resonance angiography
- Duplex imaging

What studies will be done if surgical intervention is anticipated for a 78 y.o. patient, PMH: CAD, HTN, DM 2?
Nursing Management

Nursing Diagnoses

• Ineffective peripheral tissue perfusion
• Activity intolerance
• Chronic pain
• Ineffective health management

*What will be evaluated to know goals are met?

Nursing Management

Planning

• Overall goals for patient with PAD
  – Adequate tissue perfusion
  – Relief of pain
  – Increased exercise tolerance
  – Intact, healthy skin on extremities
  – Increased knowledge of disease and treatment plan

Interprofessional Care

Risk Factor Modification

• Tobacco cessation
• Glycosylated hemoglobin <7.0% for diabetics
• Aggressive treatment of hyperlipidemia
• BP maintained <140/90
Interprofessional Care

Drug Therapy

• **ACE inhibitors**
  - Ramipril (Altace)
    - ↓ Cardiovascular morbidity/mortality
    - ↑ Peripheral blood flow
    - ↑ ABI
    - ↑ Walking distance

• **Antiplatelets/Anticoagulants**
  - Aspirin
  - Clopidogrel (Plavix)
  - Heparin IV

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Interprofessional Care

**EXERCISE THERAPY**

- Exercise improves oxygen extraction in legs and skeletal metabolism
- Walking is most effective exercise for individuals with claudication
  - 30 to 45 minutes daily, 3 times/week

**NUTRITIONAL THERAPY**

- BMI <25 kg/m²
- Waist circumference <40 inches for men and <35 inches for women
- Recommend reduced calories and salt for obese or overweight persons

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Interprofessional Care

**Leg With Critical Limb Ischemia**

- Conservative Treatment:
  - Improve arterial perfusion
    - Intravenous Heparin drip
      (25,000 units/500ml NS, D5W)
  - Protect from trauma
  - Decrease ischemic pain
  - Prevent/control infection
25,000 Units/500ml 0.9% N5 - Bolus 4000 units, start at 500 unit/hr
How many ml/hr will be set on the infusion pump?

<table>
<thead>
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<th>PTI (Quick)</th>
<th>mL/hr</th>
<th>Heparin Drip</th>
<th>Change Drip within</th>
<th>Follow-up PTI after this calculation</th>
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<tbody>
<tr>
<td>≤ 40</td>
<td>1000</td>
<td>bolus</td>
<td>500 ml/hr</td>
<td>6 hours</td>
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<td>40-70</td>
<td>500</td>
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<td>151-200</td>
<td>100</td>
<td>bolus</td>
<td>500 ml/hr</td>
<td>6 hours</td>
</tr>
</tbody>
</table>

What is the nursing management for a patient on a heparin gtt?

Interprofessional Care
Leg With Critical Limb Ischemia
• Percutaneous transluminal angioplasty (PTA)
• Atherectomy/Endarterectomy
• Peripheral artery bypass surgery
• Patch graft angioplasty
• Amputation

*All require pre-operative and post-operative nursing management specific to procedure done
*Think about nursing management

Nursing Management
Nursing Implementation

• Acute Care
  – Frequently monitor after surgery
    • NEUROVASCULAR CHECKS (Q15 min, Q1-2 hours)
      – Palpation, doppler
    • Skin color and temperature
    • Capillary refill
    • Presence of peripheral pulses distal to the operative site
    • Sensation and movement of extremity
Nursing Management
Nursing Implementation

• Acute Care
  – Continued circulatory assessment
  – Monitor for potential complications
  – Knee-flexed positions should be avoided except for exercise
  – Turn and position frequently

Nursing Management
Nursing Implementation

• Ambulatory Care
  – Management of risk factors
  – Long-term antiplatelet therapy
  – Importance of supervised exercise training after revascularization
  – Importance of meticulous foot care
    – Daily inspection of the feet
    – Comfortable shoes with rounded toes and soft insoles
    – Shoes lightly laced

Nursing Management
Nursing Implementation

Foot Care:
• Carefully inspect, cleanse, and lubricate feet to prevent cracking of the skin and infection
• If ulceration is present, keep affected foot clean and dry. Cover ulcers with a dry, sterile dressing to maintain cleanliness
• Deep ulcers can be treated with a variety of wound care products, but healing is unlikely without increased blood flow. Systemic antibiotics are used in patients with CLI, skin ulcerations, and limb infection
• Encourage the patient to select soft, roomy, and protective footwear and avoid extremes of heat and cold
Audience Response Question

The nurse teaches a patient with peripheral arterial disease. The nurse determines that further teaching is needed if the patient makes which statement?

a. “I should not use heating pads to warm my feet.”
b. “I should cut back on my walks if it causes pain in my legs.”
c. “I will examine my feet every day for any sores or red areas.”
d. “I can quit smoking if I use nicotine gum and a support group.”