Assessment and Treatment
Lower Extremity Ulcers
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Training Objectives
• Distinguish pressure ulcers from lower extremity ulcers
• Define the characteristics of venous, arterial and peripheral neuropathy/diabetic ulcers
• Describe effective strategies to prevent and manage lower extremity wounds

Lower Extremity Wounds
• Arterial Insufficiency
• Venous Insufficiency
• Peripheral Neuropathy/Diabetic

Arterial Insufficiency Risk Factors
• History
  – Atherosclerosis is the most common cause of lower extremity arterial disease
  – Diabetes
  – Tobacco Products
  – Hyperlipidemia
  – Advanced Age
  – Obesity
  – A Family History of Cardiovascular Disease

Arterial Insufficiency Risk Factors
• History continued
  – Anemia
  – Arthritis
  – CVA
  – Intermittent Claudication
  – Traumatic Injury to Extremity
  – Vascular Procedures/Surgeries
  – Hypertension
  – Arterial Disease
**Arterial Insufficiency**

**Signs & Symptoms**
- Extremity becomes pale/pallor with elevation and has dependent rubor
- Skin: shiny, taut, thin, dry, hair loss of lower extremities, atrophy of subcutaneous tissue
- Increased pain with activity and/or elevation (intermittent claudication, resting, nocturnal and positional)

**Arterial Insufficiency Tests**
- Ankle Brachial Index (Doppler)
  - < 0.8
- Systolic Toe Pressure (Doppler)
  - TP < 30
- Transcutaneous Oxygen Pressure Measurements (TcPo2)
  - TcPo2 < 40 mm Hg

**Arterial Insufficiency Ulcers**
- Location
  - Toe tips and/or web spaces
  - Phalangeal heads around lateral malleolus
  - Areas exposed to pressure or repetitive trauma (shoe, cast, brace, etc.)

**Arterial Insufficiency Ulcers**
- Characteristics
  - Deep, "punched out"
  - Pale wound bed
  - Necrotic tissue
  - Minimal exudate
  - Even wound margins
  - Cellulitis common
  - Associated with PVD
  - Painful, in absence of neuropathy
Arterial Insufficiency Interventions

- Measures to Improve Tissue Perfusion
  - Revascularization if possible
  - Lifestyle changes (no tobacco, no caffeine, no constrictive garments, avoidance of cold)
  - Hydration
  - Measures to prevent trauma to tissues (appropriate footwear at ALL times)

- Nutrition
  - L-Arginine (vasodilator properties) oral intake of 6.6 g/day for 2 weeks improved symptoms of intermittent claudication
  - Provide nutritional support with 2,000 or more calories preoperatively and postoperatively, if possible; this has been benefited patients undergoing amputations

- Pain Management
  - Recommend walking to near maximal pain three times per week
  - Pain medication as indicated

- Topical Therapy
  - Dry uninfected necrotic wound: KEEP DRY
  - Dry INFECTED wound: Immediate referral for surgical debridement/aggressive antibiotic therapy (Topical antibiotics are typically ineffective for arterial wounds)

- Adjunctive Therapies
  - Hyperbaric oxygen therapy
  - High-voltage pulsed current (HVPC) electrotherapy

- Patient Education

Venous Insufficiency
Venous Insufficiency Risk Factors

- History
  - Previous DVT & Varicosities
  - Reduced Mobility
  - Obesity
  - Vascular Ulcers
  - Phlebitis
  - Traumatic Injury
  - CHF
  - Orthopedic Procedures
  - Pain Reduced by Elevation
  - History of Cellulitis

Venous Insufficiency Signs & Symptoms

- Lower Leg characteristics
  - Edema
    - Pitting or non-pitting
  - Venous Dermatitis (erythema, scaling, edema and weeping)
  - Hemosiderin Staining
    - Brown staining (hyperpigmentation)
  - Active Cellulitis

Venous Insufficiency Signs & Symptoms

- Pain
  - Minimal unless infected or desiccated
- Peripheral Pulses
  - Present/palpable
- Capillary Refill
  - Normal-less than 3 seconds

Venous Insufficiency Ulcers

- Location
  - Medial aspect of the lower leg and ankle
  - Superior to medial malleolus

Venous Ulcer

Characteristics

- Superficial (dermal)
- Ruddy, granular tissue
- Irregular wound margins
- Erosions usually present
- Usually painless
- Associated with venous disease
Venous Insufficiency

Venous Insufficiency Treatment

• Elevation of legs
• Compression therapy to provide at least 30mm Hg compression at the ankle
• T.E.D. hose or anti-embolism stockings and Ace wraps are not effective compression

Venous Insufficiency Treatment

• Recommend to get a baseline ABI
  – If ABI is >.8 use compression at ankle at 30-40 mm/HG or 20-30 mm/HG depending severity
  – If ABI is .8 to .6 use reduced compression up to 23mm/HG
  – If ABI is .5, resident has a DVT or exacerbated CHF compression is contraindicated

Venous Insufficiency Treatment

• Compression wraps to get edema under control or while wounds are healing:
  • Short Stretch/compression wraps
    – REPARA® Unna Boots (Select Medical Products)
    – SurePress® or Unna-FLEX® (ConvaTec)
    – Coban™ (3M)
    – PROFORE™ & PROGUIDE™ (smith&nephew)
  • In severe cases compression pumps
  • Manufactures instructions must be followed when applying

Venous Insufficiency Treatment

• Rated compression stockings once edema is under control
  – Need to be fitted
  – Monitor for loss of elasticity

Venous Insufficiency Treatment

• Topical Therapy
  – Absorb exudate (e.g. alginate, foam)
  – Maintain moist wound surface (e.g. hydrocolloid)
  – Hydrocortisone for active venous dermatitis, once under control petroleum products to lower legs only (no mineral or lanolin oil)
  – Monitor and treatment of cellulitis
• Patient Education
Peripheral Neuropathy/Diabetic Risk Factors

- History
  - Diabetes
  - Spinal cord injury
  - Hypertension
  - Smoking
  - Alcoholism
  - Hansen’s Disease
  - Trauma to lower extremity
  - Family history

***Please note that there are over 100 known causes***

Peripheral Neuropathy/Diabetic Signs & Symptoms

- Relief of pain with ambulation
- Parasthesia of extremities
- Altered gait
- Orthopedic deformities
- Reflexes diminished
- Altered sensation (numbness, pricking, tingling)

Peripheral Neuropathy/Diabetic Signs & Symptoms

- Intolerance to touch (e.g., bed sheets touching legs)
- Presence of calluses
- Fissures/cracks, especially the heels

- Arterial insufficiency commonly co-exists with peripheral neuropathy!

Peripheral Neuropathy/Diabetic Tests

- Light pressure using a Semmes-Weinstein Monofilament Exam
- Vibratory sense using a tuning fork
- Deep tendon reflexes of ankle and knee
- Recommend an ABI as arterial insufficiency commonly co-exists

Peripheral Neuropathy Diabetic Location

- Plantar aspect of the foot
- Metatarsal heads
- Heels
- Altered pressure points
- Sites of painless trauma and/or repetitive stress

Diabetic (Neuropathic) Ulcer

- Deep
- Painless
- Even wound margins
- Callous surrounding ulcer
- Granular tissue, unless PVD
- Cellulitis or osteomyelitis
- Associated with diabetes
Peripheral Neuropathy/Diabetic Treatment

- Pressure relief for heel ulcers
- "Offloading" for plantar ulcers (bedrest, contact casting, or orthopedic shoes)
- Appropriate footwear
- Tight glucose control
- Aggressive infection control
- Treatment for co-existing arterial insufficiency

Peripheral Neuropathy/Diabetic Treatment

- Topical Treatment
  - Cautious use of occlusive dressings
  - Dressings to absorb exudate
  - Dressings to keep dry wound moist
- Chronic or non-responding wounds:
  - Growth factors
  - Skin equivalents
  - Negative Pressure Wound Therapy (NPWT)
  - Hyperbaric Oxygen
- Patient Education

Mixed Etiology

- Use reduced compression bandages of 23-30 mm Hg at the ankle. Compression therapy should not be used in patients with ABI < 0.5
- Keep extremities in neutral position
- Protect from trauma
Lower Extremity Wounds

- Documentation Tips
  - Assess wound weekly, noting location, type, size, wound base, wound edges, drainage, odor and pain
  - Do not stage lower extremity ulcers: Partial or Full thickness instead
  - Ensure care plan has appropriate goals
  - Physician diagnosis and prognosis

Resources

- Available Resources and Web Sites:
  - www.wocn.org (Wound, Ostomy & Continence Nurse Society)
  - www.ahrq.gov (Agency for Health Care Research and Quality, formally AHCPR)
  - www.aawm.org (American Academy of Wound Management)
  - www.npuaap.org (National Pressure Ulcer Advisory Panel)
  - www.woundsource.com (Great source to find wound care products)

Questions?

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