Wound Care 101 - Venous (LEVD) and Arterial (LEAD)

Everything you always needed to know but didn’t want to ask …..

Speakers

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Objectives for Venous (LEVD) and Arterial (LEAD) Wounds – Management and Treatment

- Will be able to
  - Discuss the difference between Venous and Arterial Disease.
    History, Risk factors and Comorbidities.
  - Assess a Venous wound for location, wound bed, surrounding skin.
  - Assess a Arterial wound for location, wound bed, surrounding skin.
  - Discuss complications and pain in a Venous wound and disease.
  - Discuss complications and pain in a Arterial wound and disease.
  - Discuss when to do Non-Invasive Vascular Test on Venous and Arterial patient and make a referral for other Treatment when needed.
  - List Topical Goals and options to treat Venous and Arterial patient and wounds.
Venous and Arterial Wounds – Management and Treatment

Name Change –
PVD Peripheral Vascular Disease  PAD Peripheral Artery Disease
New:  LEVD Lower Extremity Venous Disease
New:  LEAD Lower Extremity Arterial Disease
Name Change -
New: LEVD Lower Extremity Venous Disease
Venous Assessment: History and Risk Factors

- Advanced Age
- Obesity
- Pregnancy
- Thrombophilia
- Systemic inflammation
- Anticardiolipin antibody
- VTE – Venous thromboembolism (phlebitis)
- Varicose Veins
- Pulmonary embolus
- Sustained venous hypertension

- Sedentary lifestyle or occupation-reduced mobility
- Simultaneous insufficiency of 2 out of 3 venous systems
- Trauma/surgeries/leg fractures
- Impaired calf muscle pump
- Restricted range of motion of the ankle
- Family history of venous disease
- Injection drug user
- Pervious wound – Trauma cause of wound

All these Conditions challenge the System and contribute to Valvular Dysfunction.
Venous Assessment

Comorbidity Conditions

- Congestive Heart Failure
- Lymphedema
- Orthopedic procedures
Vascular Anatomy - Venous System in the Leg

Superficial, Deep and Perforating veins – flow from top down with a one way bicuspid valve

- Femoral vein
- Popliteal vein
- Tibial vein
- Venous arch
- Greater saphenous vein
- Lesser saphenous vein
- Venous arch
Vascular Anatomy

Superficial, Deep and Perforating veins – flow from top down with a one way bicuspid valve
Venous Insufficiency

Legs currently with no wounds
Venous Assessment

Wound Bed Characteristics

**Location:** Gaiter area - most frequently above medial malleolus but can occur anywhere on the lower leg.

**Size:** Can be small to circumferential, shallow, with irregular wound margins

**Wound bed:** Ruddy red color, granulation tissue. Can have yellow fibrinous slough that is adherent or loose.

**Drainage/Exudate:** Frequently moderate to large

**Infection:** Not common
Venous Assessment

Surrounding Skin Characteristic

- **Edema:**
  - Pitting or non-pitting
  - Worsens with prolonged standing or sitting with legs dependent

- **Scarring from previous wound**

- **Ankle Flare**

- **Hyperpigmentation** –
  - Hemosiderosis (brown staining)

- **Venous dermatitis**

- **Maceration**

- **Lipodermatosclerosis:**
  - Panniculitis (inflammation of subcutaneous fat) 2/3rds of effected people are obese.

- **Atrophie blanche:**
  - Scarring arising from skin injury when the blood supply is poor

- **Temperature:** Normally warm to touch.

- **Localized elevation of skin temperature**
  - at the ankle (over 4F) is predictive of a wound.
Venous Assessment Surrounding Skin

Characteristic Hemosiderosis & Atrophie Blanch

🌟 Hyperpigmentation –
Hemosiderosis (brown staining)

🌟 Atrophie blanche:
- Scarring arising from skin injury when the blood supply is poor
Venous Assessment
Complications

- **Venous dermatitis:**
  - Erythema, itching, vesicles, weeping, scaling, crusting, afebrile

- **Infection/Cellulitis**
  - Pain, erythema, swelling, induration, bulla, fever

- **Variceal bleeding**

- **Tinea pedis**
  - Fungal foot infection

- **Venous thromboembolism – VTE**
  includes both
  - DVT Deep vein thrombosis
  - PE pulmonary embolism
Venous Assessment for Pain - Peripheral Pulses - Non-Invasive Vascular Test – Loss of Protective Sensation

**Perfusion/Sensation of the Lower Extremity: Pain**
- Leg Pain will ranges from:
  - Itchy, sore, dull, sharp, throbbing
  - Complain of pain from the leg being heavy
  - When the leg is dependent the pain may worsen
  - Raising/Elevating the leg may decrease fluid and pain.

**Perfusion/Sensation: Peripheral Pulses**
- Pluses are present and palpable

**Perfusion/Sensation: Non-Invasive Vascular Test**
- Check Capillary Refill: Normal is less than 3 seconds
- Check Venous Refill: less than 20 sec)
- Check ABI ankle brachial Index Is normal (1.0 – 1.3)

**Perfusion/Sensation: Screen for Loss of Protective Sensation**
- Use a 10g Semmes–Weinstein monofilament to assess for peripheral, sensory neuropathy.
Venous Measures to Improve Venous Return & Prevent Trauma

- Need Vascular studies done to rule out LEAD
- Use Compression therapy:
  - 30-42 mmhg if ABI greater than 0.8
  - 23-30 mmhg if ABI less than 0.8
  - Do not apply if ABI less than 0.5
  - Multi-layer compression is more effective that a single layer system
  - For immobile or need higher compression do an Intermittent Pneumatic compression
- Elevate legs above the level of the heart 4x/day  30 minutes
- Stop smoking
- Medications to improve blood flow (pentoxifylline)
- Increase Exercise
  - Walking, calf muscle exercise, toe lifts and ankle flexion exercises
- Avoid
  - garments that constrict, prolonged standing, crossing legs, high heeled shoes.
- Weight needs to be monitored
- Surgery may be needed.
  - Damaged veins obliterated . SEPS subfascial endoscopic perforator
Venous – Topical Therapy Goals – Considerations/Options & Adjunctive Therapy

**Topical Therapy: Goals**
- Control Edema
- Absorb exudate
- Prevent trauma/injury
- Identify/treat infection
- Promote wound healing/maintain moist wound surface
- Protect periwound skin
- Minimize pain

**Adjunctive Therapy**
- Skin Substitutes
- Electrical Stimulation
- Ultrasound

- Use of absorptive dressings to control the exudate
- Treat infection: Let the culture guide the antibiotic /antimicrobial therapy.
  - For Superficial infection Consider topical antibiotic /antimicrobial therapy
  - For Deep tissue infection/cellulitis will need systemic treatment
- Remove all devitalized tissue
- Avoid known skin irritant and allergens with patient who have venous dermatitis or eczema.
- Identify an treat dermatitis or eczema with topical steroids.1 -2 weeks. No response refer to a dermatologist.
- Consider topical analgesics if painful wound care or debridement
- Use emollients such as petrolatum to manage dry scaly skin.
Case Study - Venous Assessment
What would you do?
C. O. R. E. Principles

For management of Venous Disease

- **C**ompression
- **O**ptimize the local wound environment
- **R**eview contributing
- **E**stablish maintenance plan
Arterial (LEAD) Disease & Wounds – Management and Treatment

Name Change -
New: New:  LEAD Lower Extremity Arterial Disease
Most common site of atherosclerotic disease in the lower extremity is the popliteal artery.

Predominant blood supply to the plantar arch from the dorsalis pedis artery.
Arterial Assessment: History and Risk Factors

- Advanced age.
- Smoking.
- Diabetes.
- Hyperlipidemia.
- Hypertension.

- Hyperhomocysteinemia.
- Chronic renal insufficiency.
- Family history of cardiovascular disease.
- Ethnicity

All these Conditions challenge the System and contribute to Arterial disease.
Arterial Assessment

Comorbidity Conditions

- Cardiovascular disease
  - Arteriosclerosis increase thickening and decrease elasticity
  - Atherosclerosis plaque formation that narrows inside of vessel and blood flow
- Vascular procedures or surgeries.
- Sickle cell anemia.
- Obesity.
Location: Areas exposed to pressure, repetitive trauma, or rubbing of footwear are the most common locations:

- Lateral malleolus.
- Mid-Tibial area (shin).
- Phalangeal heads, toe tips or web spaces.
Arterial Assessment  Wound Bed Characteristics

Size:
- Variable; often small.

Wound Bed:
- Pale; granulation rarely present; necrosis common; eschar may be present.

Depth:
- May be deep.

Margins:
- Edges rolled, smooth, undermined; punched-out appearance.

Drainage/Exudate:
- Minimal.

Infection:
- Frequent (signs may be subtle).

Pain:
- Common.

Non-healing:
- Often precipitated by minor trauma.
Arterial Assessment

Surrounding Skin Characteristic and Nails

Surrounding Skin Characteristic

– Pallor on elevation
– Dependent rubor
– Purpura
– Shiny, taut, thin, dry
– Hair loss over lower extremity
– Atrophy of skin, subcutaneous tissue and muscle
– Edema: Atypical of arterial disease.
– Temperature: Skin feels cold to touch.

Assessment: Nails

– Dystrophic.
Peripheral Arterial Disease

Skin changes and dependent rubor
Arterial Assessment Complications

**Infection/Cellulitis:**
- pain, edema, periwound fluctuance;
- or only faint halo of erythema around wound.

**Osteomyelitis:**
- probe to bone

**Gangrene (wet or dry).**
Arterial Assessment

Perfusion/Sensation of the Lower Extremity: Pain

- Intermittent claudication:
  - cramping, aching, fatigue, weakness or pain in the calf, thigh or buttock, which occurs after exercise; and
  - is only relieved by 10 minutes rest is a Classical Sign.
  - 70% occlusion

- Resting, positional pain
  - 70 – 90% occlusion

- Nocturnal pain may be present.
  - > 90% occlusion

- Elevation exacerbates pain. (Worse)

- Dependency relieves pain. (Better)

- Paresthesia may occur.

- A sudden onset of the 6 P’s
  - pain,
  - pulselessness,
  - pallor,
  - paresthesia,
  - paralysis, and
  - polar [coldness])
  - indicates an acute embolism;
  - and warrants an immediate referral to a vascular surgeon.

10/9/15

VPTA Conference - Eva Sauls RN CWOCN - Vicky Valenski PT DPT CWS
Arterial Assessment
Perfusion/Sensation of the Peripheral Pulses

- Pulses are absent or diminished
  - pedal,
  - posterior Tibial.
- Femoral or popliteal bruits may be heard.
Arterial Assessment

Perfusion/Sensation: Non-Invasive Vascular Test

Capillary refill:
- Abnormal greater than 3 seconds.

Venous refill time:
- Prolonged greater than 20 seconds.

Ankle brachial index (ABI):
- LEAD: Equal to/or less than 0.9.
- Borderline: Equal to/or less than 0.6–0.8.
- Severe ischemia: Equal to/or less than 0.5.
- Critical ischemia: Equal to/or less than 0.4.

Transcutaneous oxygen (TcP02):
- Less than 40 mmHg is hypoxic.

Toe brachial index (TBI):
- Less than 0.64 indicates LEAD.

Toe systolic pressure (TP):
- Less than 30 mmHg indicates critical limb ischemia (CLI).
- Less than 50 mmHg if Diabetes indicates critical limb ischemia (CLI).
Arterial Assessment  Perfusion/Sensation: Screen for Loss of Protective Sensation

Assess light pressure sensation using a 10-g Semmes-Weinstein monofilament.

Assess vibratory sensation using a 128 Hz tuning fork.

Check deep tendon reflexes at the ankle/knee with a reflex hammer.

Inability to feel the monofilament.

Diminished vibratory perception

Diminished reflexes indicate a loss of protective sensation and an increased risk of wounds.
Arterial - Measures to Improve Tissue Perfusion

- Revascularize surgery if possible.
- Change lifestyle:
  - Stop smoking ****
  - Avoid caffeine
  - Restrictive garments
  - Cold temperatures.
- Maintain proper hydration/nutrition.
- Maintain legs in a neutral or dependent position.

- Increase physical activity:
  - Walking
  - Supervised exercise for 30–45 minutes, 3 times per week.

- Use medications to control:
  - Hypertension
  - Hyperlipidemia
  - Diabetes
  - Antiplatelets to improve blood cell flow/movement through narrowed vessels.
Arterial - Measures to Prevent Trauma

- Use proper foot wear !!
- Use pressure redistribution for
  - Heel
  - Toes
  - All bony prominences
  - Especially if in bed
- Obtain professional nail and callus care.
- Self-inspect the lower extremities on a daily basis.

Avoid chemical, thermal, mechanical injury
- no bare feet even in the house
- no hot soaks or heating pads
- no medicated corn pads
- wear socks/stockings with shoes
Arterial – Topical Therapy: Goals

- Prevent trauma/injury.
- Identify/treat infection.
- Promote wound healing.
- Minimize pain.
- Preserve limb.
If infection aggressively treat it.

Dry, non-infected wounds with stable, fixed eschar/necrosis:
- Keep dry, no debridement.
- Assess perfusion status.

Infected, necrotic wounds:
- Refer for revascularization/surgical removal of necrotic tissue and antibiotic therapy.
- Do not rely on topical antibiotics to treat infected, ischemic wounds.
- Institute culture-guided systemic antibiotics promptly for patients with critical limb ischemia and evidence of limb infection, or cellulitis, and/or infected wounds.

Open/draining wounds with necrotic tissue:
- Consider a closely monitored trial of autolytic or enzymatic debridement.

Open/draining wounds with exposed bones or tendons:
- Consider a carefully monitored trial of moist, non-occlusive, absorbent, dressings.

Open/draining, non-necrotic wounds:
- Consider moist wound healing with non-occlusive, absorbent dressings

Avoid occlusive dressings:
- Use dressings that permit easy, frequent visualization of the wound.
Arterial – Topical Therapy:
Adjunctive Therapy

- Hyperbaric oxygen therapy.
- Arterial flow augmentation
  - intermittent pneumatic compression.
- Electrotherapy
- Low frequency ultrasound.
- Spinal cord stimulation
Arterial Ulcers
Case Study - Arterial Assessment
What would you do?
Questions