

Arterial & Venous Ulcers

A Comprehensive Review Assessment & Management



Objectives

- Understand Arterial & Venous disease
- Understand the etiology of lower extremities ulcers
- Understand assessment of lower extremities ulcers
- Understand lower extremities ulcer treatment plan
- Identify best practices in home care setting for the management of patients with lower extremity ulcers.

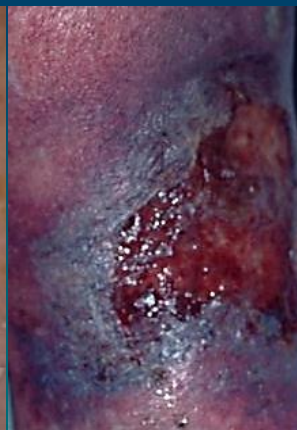
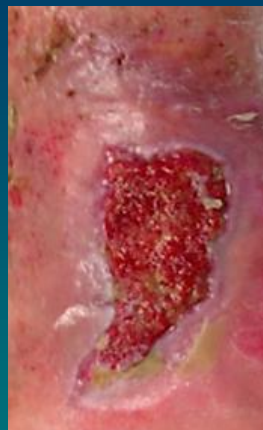


Statistics

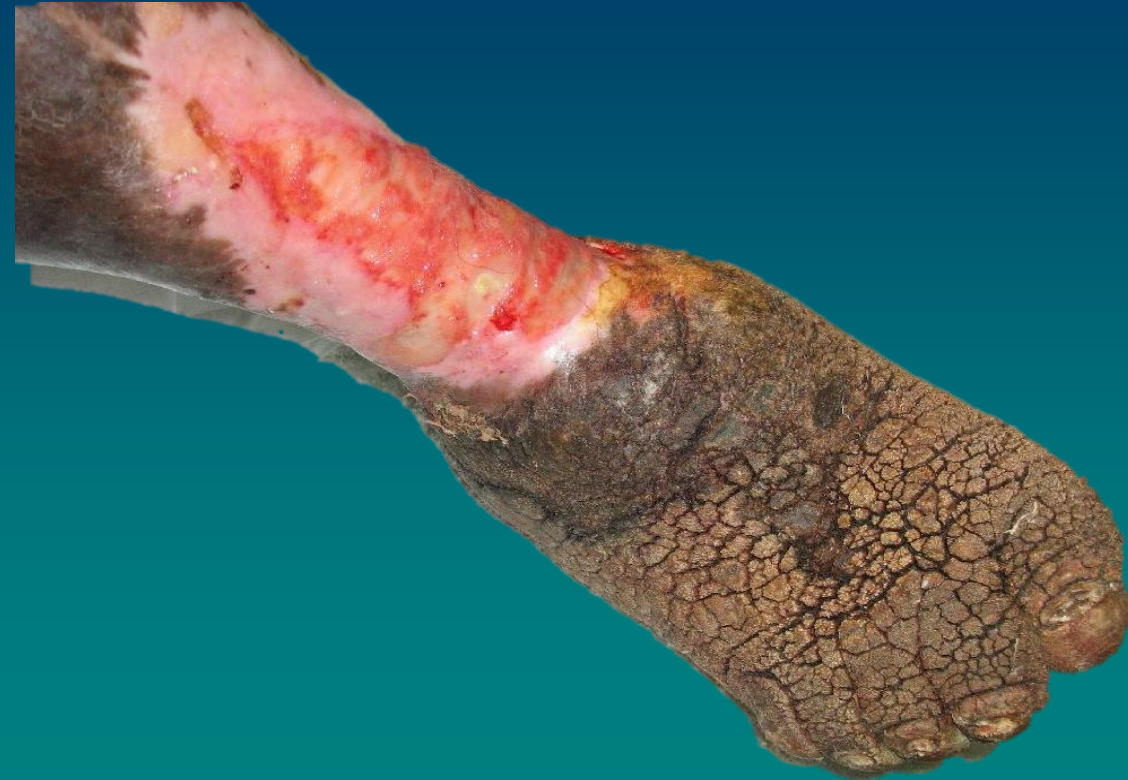
- Most commonly become Chronic Wounds
- Up to 1.3% of total adult population
- 70% of ulcers are related to chronic venous hypertension
- 10-20% of ulcers are mixed disease
- More prevalent in elderly women
- 22% of patients had ulcer before they were 40 years old
- Treatment cost: \$1.5 - 3.5 billion/year



Lower Extremity Ulcers



Lower Extremity Ulcers



Associated Conditions

- Venous Hypertension
- Arterial Ischemia
- Diabetes or Neuropathy
- Cardiovascular disease
- Infection
- Lymphedema
- Insect Bites
- Vasculitis
- Trauma



Assessment of Lower Extremities

Color Changes with Limb Elevation and Dependence

Supine, raise leg to 60°

Count the time until color changes

Place leg dependent position

Note development of rubor



Assessment of Lower Extremities

Venous Filling Time

Elevate the limb to provide for venous drainage

Place limb in dependent position

Record the time required for venous filling

Prolonged venous filling is independently predictive of PAD

Greater than 20 seconds usually indicates occlusive disease

Auscultate all major pulses for evidence
of bruits, which can indicate occlusion



Assessment of Lower Extremities

Ankle Brachial Index Test (ABI)

Using a BP Cuff and a handheld Doppler

Measure the brachial systolic pressures

Place the cuff around the ankle

Measure the systolic pressure

Dorsalis Pedis

Posterior Tibial



Assessment of Lower Extremities

Ankle Brachial Index Test (ABI)

Ankle Pressures = 120

Brachial Pressures = 120

$$120/120 = 1$$

-or-

Ankle Pressures = 60

Brachial Pressures = 120

$$60/120 = .5$$



Assessment of Lower Extremities

Ankle Brachial Index Test (ABI)

Calcification/Abnormal >1.3

Normal 1.0 - 1.3

Impairment 0.8 – 1.0

Mixed disease 0.5 - 0.8

Severe arterial insufficiency <0.5



Assessment of Lower Extremities

Diagnostic Tests

Segmental Pressures – Ultrasound

Pulse Volume Recording – PVR

Transcutaneous Capillary Perfusion - TcpO₂

Color Duplex Imaging

Angiography



Pathophysiology

Normal Venous Circulation

Superficial (Saphenous) veins carry blood under low pressure

Superficial and deep system connect via perforating veins

Deep venous system (popliteal, femoral veins) carry blood back to the heart under high pressure (have fewer valves)



Pathophysiology



Venous Hypertension

- Underlying Pathologic Mechanism for Chronic Venous Insufficiency (CVI) and Ulceration

Causes

Outflow Obstruction

Valvular incompetence

Muscle pump failure



Etiology VLU

Fibrin Cuff Theory

- Venous Hypertension - Capillary dilation
- Fibrinogen leaks into dermal tissue
- Fibrinogen hardens and forms a cuff - Barrier to O₂/nutrients
- Fibrin cuffs may indicate endothelial cell damage and affect wound healing by inhibiting collagen formation, prolong inflammation, or block growth factors



Etiology VLU

White Cell Trapping Theory

- Velocity of blood flow through capillary becomes sluggish
- White cell adhere to capillary wall, plugging capillaries causing tissue ischemia
- White cell activation
- Toxic metabolites/proteolytic enzymes
- Local occlusion, ischemia, ulceration



Clinical Signs & Symptoms

- Gaiter Distribution
- Edema | 1+
- Hemosiderin Staining | Discoloration of skin
- Venous Dermatitis | Marked Redness
- Atrophie blanche | Sluggish capillary refill
- Varicose veins | Lack of hairs on the legs
- Atrophy of the skin | Lipodermatosclerosis



Clinical Signs & Symptoms

- Usual location : Medial malleolus | Irregular edges
- Wound bed- ruddy red, yellow adherent or loose slough, undermining or tunneling uncommon
- Usually shallow, full thickness, heavily draining
- Heavily contaminated
- Surrounding skin- macerated; crusted, and scaling
- Pain is variable-severe; dull, aching or bursting



Treatment Philosophy

Identify and treat the underlying cause of the ulcer and the factors that affect wound closure

Restricted mobility | Edema in the limb

Malnutrition | Psychosocial problems

Minimize colonization | Apply Compression



Treatment Philosophy

TYPES OF COMPRESSION

Short Stretch Bandages

Paste Boot/Unna Boot

Long Stretch Bandages

Bandaging “Systems”

Compression Stockings

Dynamic Compression Pumps



Treatment Philosophy

SHORT STRETCH BANDAGES

Typically made of cotton and relatively rigid (inelastic)

High pressure with muscle contraction against a fixed resistance

Provides light compression at rest



Treatment Philosophy

UNNA BOOT

Semi-rigid wrap around extremity to assist muscle pump with ambulation | Addresses edema

Initial pressures MAY be therapeutic | pressures dissipate

after 8 hrs, as edema decreases | May be indicated with chronic skin disorders | Not for heavily draining wounds | Comes in a variety of styles with zinc oxide, calamine, gelatin and lanolin



Treatment Philosophy



LONG STRETCH BANDAGES

Greater extensibility and elasticity in fabric | High pressure at rest, less with muscle contraction | Can provide increased pressure with position changes ('Ace' Bandages) 16 to 22 mm Hg at ankle (ankle measuring 18-25 cm) | Used over paste bandages and is layer 3 in a 4-layer system | A single wash reduces pressure by 20% | some brands have rectangles woven into the dressing turn into squares when bandage is stretched | Potential risk for ischemia with over stretching



Treatment Philosophy

COHESIVE BANDAGE

Bandage adheres to itself | Often used as a secondary wrap over paste boots and other compressive wraps | 22-26 mm Hg at ankle (ankle measuring 18-25 cm) | Sustained Compression over time | Not washable or reusable



Treatment Philosophy

MULTI-LAYER COMPRESSION BANADAGES

Provides continuous compression | 40 mmHg at the ankle (ankle measuring 18-25 cm) | Most effective | Conforms to leg shape | Bulky and hot | Needs to be applied by trained personnel



Treatment Philosophy

COMPRESSION STOCKINGS

Variety of styles from custom fit to “off the shelf” | Support calf muscle pump with ambulation | Compress superficial system to minimize edema | Variable levels of compression:

- Light 14-17 mmHg
- Medium 25-35 mmHg
- High 35-45 mmHg



Arterial Disease

Clotting | Shower of clots (small/large vessel)

Rheumatoid arthritis (arteritis) | Diabetes mellitus (atherosclerosis)

Degenerative changes with advancing age (atherosclerosis)

Raynaud's disease (vasospastic disease)



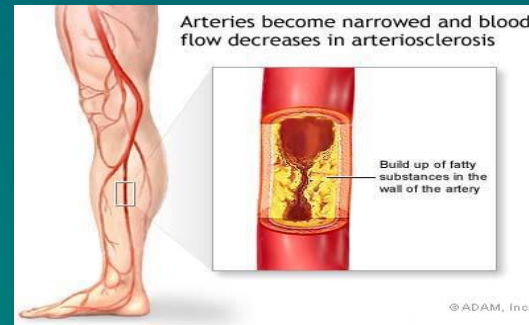
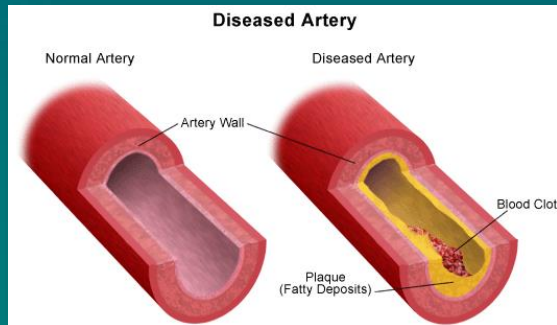
Arterial Disease

Clotting | Shower of clots (small/large vessel)

Rheumatoid arthritis (arteritis) | Diabetes mellitus (atherosclerosis)

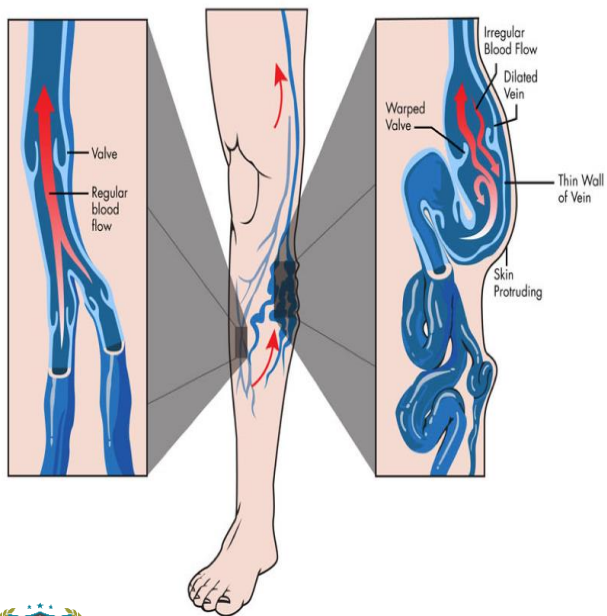
Degenerative changes with advancing age (atherosclerosis)

Raynaud's disease (vasospastic disease)



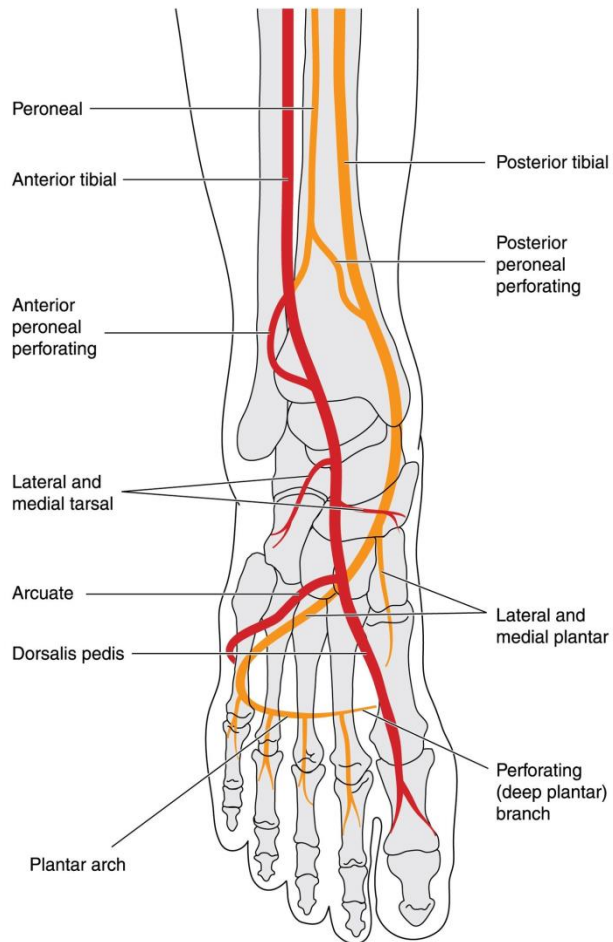
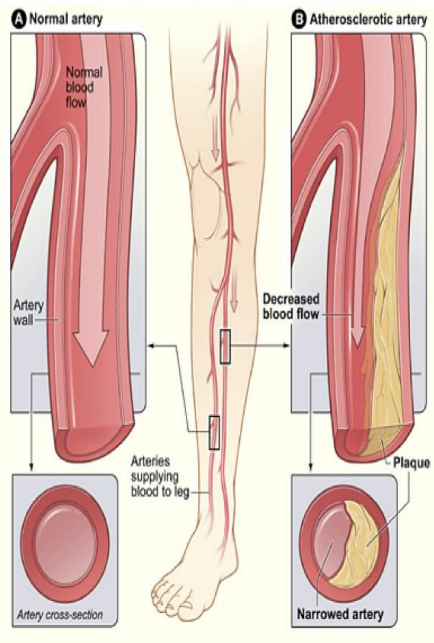
Arterial Disease

Vein Disease



Versus

Arterial Disease



Arterial Disease

Ischemic rest pain | Pain relief w/dependency | Loss of hair

Atrophic, shiny skin | Muscle wasting calf or thigh

Trophic nail changes | Poor tissue perfusion

Color changes | Coldness of the foot | Gangrene of toes

Absence of palpable pulse



Arterial Disease

Pain of sudden onset and severe intensity | Pallor

Paraesthesia (numbness) | Pulselessness (absence of pulses below the occlusion) | Paralysis (sudden weakness in the limb)

Extremity cool to touch



Management Philosophy

Pain Perfusion is Insufficient for Wound Healing

- Revascularization
- Amputation
- If patient is not appropriate for surgical intervention

Keep the wounds clean, dry and free from infection

No compression !!! No Elastic or stretchable gauze rolls



Management Philosophy

Pain Perfusion is Insufficient for Wound Healing

- Revascularization | Hyperbaric Oxygen Therapy
- Amputation
- If patient is not appropriate for surgical intervention

Keep the wounds clean, dry and free from infection

No compression !!! No Elastic or stretchable gauze rolls



References

1. Pressure ulcer staging. (2013). www.npuap.org
2. Home Health Potentially Avoidable Event Measures (2013). Centers for Medicare & Medicaid Services. www.cms.gov.
3. www.woundcarenurses.org
4. Ferrell BA, Josephson K, Norvid P, Alcorn H. Pressure ulcers among patients admitted to home care. J Am Geriatr Soc 2000; 48(9):1042-1047.
5. Bergquist S. Subscales, subscores, or summative score: evaluating the contribution of Braden Scale items for predicting pressure ulcer risk in older adults receiving home health care. J Wound Ostomy Continence Nurs 2001; 28(6):279-289.
6. Gorecki C, Brown JM, Nelson EA, Briggs M, Schoonhoven L, Dealey C et al. Impact of pressure ulcers on quality of life in older patients: a systematic review. J Am Geriatr Soc 2009; 57(7):1175-1183.

