Introduction to Wound Care

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Identify Common Wound Types

• Diabetic foot ulcers
• Pressure ulcers
• Venous ulcers
• Arterial ulcers
• Burns
• Non-healing surgical wound
• Odds and ends
Diabetic foot wounds

- Individual lifetime risk of 15-25% of developing an ulceration.
- Most common cause of non-traumatic amputations.
- Over 60% of patients with a healed ulcer will have a recurrence within 5 years.
- After amputation, up to half of these patients will have a higher level or contralateral amputation within 5 years.
- 47% increase in 5 year mortality in patients with DFU over those without.
Pathophysiology of diabetic foot ulcers

• Progressive sensory, motor and autonomic neuropathy
  • Loss of protective sensation
  • Progressive deformity with altered and increased plantar pressures
  • Changes in dermal blood flow regulation

• Arterial occlusive disease

• Cellular dysfunction – impaired healing due to decreased NO synthesis
Wagner Grading System for Diabetic Foot Ulcers:

Grade 0 – Intact skin with pre-ulcerative callus
Wagner Grading System for Diabetic Foot Ulcers:
Grade 1 – Superficial ulceration without penetration to deeper layers
Wagner Grading System for Diabetic Foot Ulcers:
Grade 2 – Deeper ulceration extending to tendon, bone or joint capsule
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Wagner Grading System for Diabetic Foot Ulcers:
Grade 3 – Deeper ulceration with abscess, osteomyelitis, or tendonitis
Wagner Grading System for Diabetic Foot Ulcers:
Grade 3 – Deeper ulceration with abscess, osteomyelitis, or tendonitis
Wagner Grading System for Diabetic Foot Ulcers:

Grade 4 – Gangrene of some portion of the toe, toes, and/or forefoot
Wagner Grading System for Diabetic Foot Ulcers:

Grade 5 – Gangrene of a large portion of the foot
Basic Diabetic Ulcer Management

• Debridement
• Infection control
  • Topical
  • Systemic
• Moisture balance
• Off-loading
• Perfusion
Pressure ulcers

• Ulcers in the regions of skin overlying bony prominences in debilitated or otherwise immobilized patients.

• Associated with comorbidities
  • Deformities
  • Undissipated forces including pressure, shear or tension over bony prominences
  • Ischemia – both long and short term
  • Malnutrition
  • Moisture retention and incontinence.
National Pressure Ulcer Advisory Panel (NPUAP) Staging System for Pressure Ulceration

• Staging system used by Agency for Health Care Research and Quality (AHRQ)
• Staging system used for ICD-9 and ICD-10 coding.
• Four ulcer stages and two additional pressure injury categories.
NPUAP Staging

Stage I – Non-blanching erythema
NPUAP Staging

Stage II – Partial thickness loss of dermis
NPUAP Staging

Stage III – Full thickness tissue loss
NPUAP Staging

Stage IV – Full thickness tissue loss with exposed tendon, muscle or bone
NPUAP Staging

Unstageable – Full thickness tissue loss covered by slough and/or eschar.
Full depth of the wound cannot be determined
NPUAP Staging

Suspected Deep Tissue Injury—Localized area of discolored but intact skin or blood filled blister. Results from damage to underlying soft tissue from pressure or shear.
Moisture Associated Dermatitis

Seen in presence of urinary and fecal incontinence in sacral and buttock regions.
Do not classify as a pressure ulcer if there are no signs of pressure injury.
Management of Pressure ulcerations

- Pressure redistribution
  - Support surfaces
    - Class I – Non-powered mattress overlays
    - Class II – Powered mattresses e.g. low air loss and rotational air mattresses
    - Class III – Air fluidized e.g. Clinitron
  - Extremity protection – Heels, ankles, elbows
  - Frequent repositioning

- Debridement of devitalized tissue
  - Sharp
  - Enzymatic
  - Autolytic

- Infection control
- Moisture control
- Nutrition
Venous stasis ulcers

- Venous valve dysfunction resulting in retrograde venous flow
  - Edema formation
  - Protein exudates
  - RBC extravasation / Hemosiderin deposits
  - WBC activation
  - Decrease tissue oxygenation due to increased diffusion distance
  - Stasis dermatitis
Venous stasis ulcerations

• Stasis Dermatitis
Venous stasis ulcerations
Venous stasis ulcerations

• Compression is the primary treatment
  • Multilayer compression dressings or Unna’s boots
  • Contact layer designed for weekly application
    • Silver hydrogel
    • Cadexomer Iodine
    • Collagen
    • Calcium alginates
    • Absorptive (e.g. Sorbion)

• Long-term compression
  • Compression stockings
  • Adjustable Velcro stockings

• Compression pumps

• Lymphedema massage
Arterial ulcers

• Ischemia—Tissue demands exceed blood supply.

• Fontaine classification of chronic limb ischemia
  • Class I – Asymptomatic
  • Class II – Intermittent claudication
  • Class III – Ischemic rest pain
  • Class IV – Ulceration and/or Gangrene
Arterial Ulcer
Arterial Ulcer
Arterial Ulcer
Burns

• Burn Classification
  • First degree – Red, dry and painful
  • Second degree – Bullae and epidermal loss, drainage, very painful
  • Third degree – Dry and leathery, insensate
  • Fourth degree – Involving subcutaneous tissue, muscle, tendon and bone
First degree burn
Second degree burn
Third degree burn
Fourth degree burn
Burns

• Treatment
  • Silver sulfadiazine most commonly used.
    • Readily available
    • Cost effective for large wounds
  • Topical antimicrobial
  • Collagen
  • Collagenase
Non-healing surgical wounds

• Dehiscence
• Seroma
• Hematoma
• Ischemic flaps
• Post-operative infections
Non-healing surgical wounds
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Non-healing surgical wounds

• Treatment is tailored to the unique property of the wounds.
  • Negative pressure wound therapy typically the most effective.
  • Wet to dry
    • 0.25% acetic acid
    • Dakin’s solution (sodium hypochlorite)
    • Hypochlorous acid
• Infection control
• Drainage control
Negative Pressure Wound Therapy Application
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Odds & Ends
Odds & ends

• Calciphylaxis
  • Vascular calcification
  • Skin necrosis
  • Renal failure
  • Hypercalcemia
  • Hyperphosphatemia
  • Secondary hyperparathyroidism
  • Uremia
  • 60-80% mortality
Odds & ends

• Melanoma
  • Excision (amputation in this case)
Odds & ends

• Basal cell carcinoma
  • Biopsy
  • Surgical excision
  • Aldara (Imiquimod 5%)
Odds & ends

• Skin tears
  • Reapproximate the margins of the skin flap
  • The edges of the free flap are often rolled under
  • Secure with steri-strips and cover with a foam dressing
Odds & ends

• Pyoderma Gangrenosum
  • Non-infectious neutrophillic dermatosis
  • Associated with autoimmune disease
  • Pathergy
  • Treatment
    • Systemic corticosteroids
    • Dapsone
    • Local steroid injection
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Ready for Lunch?