Wound Care: What the Internist Can Do

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Conflicts of Interest

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Objectives

- Discuss venous stasis, venous stasis dermatitis and venous insufficiency
- When to use compression and how much
- Develop a basic and rational understanding of patients with chronic wounds
Venous stasis

- Happens when pressure in the veins exceeds that of tissue pressure
- Can see changes on skin over time
  - Hemosiderin staining
  - Lipodermatosclerosis
  - Elephantiasis nostras verrucosa
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Venous stasis in a pannus
Venous Stasis Dermatitis

- Over time fluid in dermis causes inflammation
- This leads to erythema, scale and crusting
- Inflammation can be so severe that can have fluid leak directly from the skin
Venous Stasis Dermatitis

- Almost always starts unilateral
- Ask questions about injury of surgeries to affected leg
  - Broken ankle
  - Hip or knee replacement
  - Vein stripping
  - CABG
Venous Stasis Dermatitis

- Treatment
  - Compression
  - Compression
  - Compression
  - Compression
  - Compression
Venous Stasis Dermatitis

- **Treatment**
  - Some compression is better than no compression
  - ABI should be >0.6
    - Dorsalis pedis pulse 40 mmHg
  - Start with light compression and then move up gradually
  - Strong topical steroids
    - Clobetasol
    - Fluocinonide
Venous Stasis Insufficiency

- At some level this happens to everyone
- Valve failure
- Once stasis dermatitis is resolved or stasis ulcer healed patient will need life time support stocking for prevention
Basic approach to the chronic wound
The Wound Care Paradigm

- Patient Centered Concerns
- Excellent Wound Care
- Treat Underlying Cause
Wound Healing Takes TIME

- T/D—Tissue/Debridement
- I—Infection/Inflammation
- M—Moisture balance
- E—Edge Affect/ECM
Tissue

- Factor affecting healthy tissue
  - Nutritional status
  - Perfusion
- Viable verses Necrotic tissue
  - Necrotic tissue must be removed
    - Harbors environment for bacterial overgrowth and increases risk of infection
    - Typically referred to a slough. This is not a biofilm
Infection

- All chronic wounds are colonized
- Wounds go through a step wise process of:
  - Contamination
  - Colonization
  - Critical colonization
  - Infection

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Infection

- Wound infection is defined as the presence of replicating microorganisms within a wound with subsequent host injury†

- Infection = dose x virulence/host resistance†

Infection

- Wound infection is far less common than contamination or colonization
- Common flora: *Corynebacteria sp.*, coagulase neg *Staph*, and *Streptococci sp.*
Infection

- Wound infection is a clinical diagnosis not a microbiological diagnosis
- Wound culture should guide antibiotic use not dictate whether the wound is infected
Infection

- Classical clinical signs of infection
  - Increasing pain
  - Erythema
  - Edema
  - Heat
  - Purulent exudate

- Many times these signs are not present in a chronic wound
Infection

- It is important to differentiate between a superficial infection and deep infection
  - In superficial infections topical antibiotics can typically be utilized
  - In deeper infections systemic therapy is usually necessary
  - There is no data that adding a topical antimicrobial agent while a patient is on systemic therapy results in increased wound healing
Superficial Infection (Critical Colonization)

**NERDS**
- **N:** Nonhealing wound
- **E:** Exudate
- **R:** Red granulation tissue
- **D:** Debris—Tissue—Nonviable
- **S:** Smell
Deep Infection

True Infection

- STONEES
  - S: Size of wound is increasing
  - T: Temperature—surrounding tissue
  - O: Osteomyelitis
  - N: New wound breakdown
  - E: Exudate/Edema
  - S: Smell
Infection

- More valid clinical signs that a chronic wound is infected†
  - Increasing pain
  - Friable granulation tissue
  - Wound breakdown
  - Foul odor

†Gardner et al., The validity of the clinical signs and symptoms used to identify localized chronic wound infection. Wound Repair and Regeneration 2001:9(3)178-186
Infection

- Age of wound can help predict organisms
  - First four weeks
    - G+ organisms
      - Enterococci, β hemolytic Strept, Staph aureus
  - Second four weeks
    - Anaerobic gram- rods
      - Protus sp, E.coli. Klebsiella
  - After eight weeks
    - Nonlactose fermenting G-aerobic rods
      - Pseudomonas, Stenotrophomonas, Acinetobacter
Treatment of Critical Colonization
NERDS

- It is reasonable to try a topical therapeutic approach using antiseptics or topical antibiotics
  - Povidone-iodine/Cadexomer iodine
  - Hydrogen Peroxide
  - Acetic acid
  - Chlorhexidine
  - Topical antibiotic
    - Silver, Bacitracin, Neosporin, white petrolatum
Treatment of Deep Infection
STONEES

- “Early” chronic wound
  - Cephalexin or Clindamycin
- “Late” chronic wound
  - Amoxicillin-clavulanate
  - Cephalexin + metronidazole
  - Ciprofloxacin + clindamycin
  - Doxycycline + trimethoprim
Moisture Balance

“To date, research and clinical experience have identified that in a moist environment exudate controls infection, provides the cells involved in wound repair with nutrients, and provides the best environment for healing.”

Moisture Balance

- Angiogenesis is enhanced in a moist wound environment\(^1\)
- Signaling proteins and cytokines are present in wound exudate
- Pain reduction in occluded moist wounds\(^2\)

Moisture Balance

- Multiple wound dressings to choose from to get desired moisture balance
  - Alginates
  - Hydrocolloids
  - Hydrogels
  - Vaseline gauze
  - Foams
  - Silicone based dressing

www.doyenmedipharm.com/.../ProductsWound.gif
Moisture Balance

- Wet to dry dressings are no longer the standard of care.
- If you order wet to dry dressings and there is an adverse outcome you will lose in a court of law.
- Wet to dry dressings are painful and have a much higher infection rate.
Moisture Balance

- When all else fails and you don’t know what to do:
  - Vaseline and some type of dressing
  - Refer to wound center
Edge Affect

- Escar delays keratinocyte migration
- Hyperkeratosis (callus) on the wound edge will also delay keratinocyte migration
  - Callus tells you that there has been long standing pressure and that pressure redistribution is necessary
EMC/Biological Dressing

- Growth factors
  - PDGF
- Dermal grafts
- Collagen based dressings
- Epidermal/dermal grafts
- Amniotic membrane
- Intravenous molecularly engineered

Wound Care

“Maintenance wound” verses a healing wound
Thank You