Wound Care 101

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Wound Classification

Etiology¹
- Surgical/non-surgical
- Acute and chronic

Depth¹
- Superficial, partial-thickness, and full-thickness
- Pressure ulcer staging

Comparison of superficial, partial-thickness and full-thickness wounds

Wound Basics

- Standard of care is no longer wet-to-dry dressings
  - This keeps wounds in a constant inflammatory state, slowing down wound healing

- With any wound, always take care to protect the periwound edges
- Don’t desiccate the wound bed
Dressing Basics

- Type and amount of drainage dictates the type of dressing used
- If a wound is too dry, hydrate the wound with gels
- If a wound has too much drainage, use foams to absorb the moisture

- Film = Poly skin
- Hydrogel = Duoderm gel
- Hydrocolloid = Duoderm
- Alginate = Aqualoc, & Aquadex AG
- Foam = Allyven foam – with and without adhesive
- Specialty dressing
  - Mepitel – silicone contact layer
  - Mepilex foam – silicone foam dressing – with and without adhesive border
  - Polymem – foam dressing but with surfactant which cleanses the wound, does not absorb a lot of drainage
  - Interdry AG – polyester cloth with silver impregnated in it, kills fungus and bacteria inside skin folds and wicks away moisture
  - Anti-microbial – dressings with silver, Acticoat

Managing Moisture Imbalance
Common Dressing Categories

- Exudate amount
  - None
  - Small
  - Moderate
  - Large

- Films
- Hydrogel
- Hydrocolloid
- Alginate
- Foam
- Specialty Absorbent

Exceptions to the Rule

- If the patient has decreased vascularity and you want to keep the bacterial count down
  - Keep the wound dry and paint it with betadine
- Eschar often can be used as a physiologic dressing (especially with wounds on the feet) and wound will heal under the eschar
Aging Population

- Patient population is getting older and the disease processes associated with these patients are increasing
- Medications and co-morbidities need to be taken into account when addressing wound care
- Medications impact wound healing
  - i.e. steroids, NSAIDs, anti-coagulation
- Co-morbid diseases also affect healing
  - i.e. COPD, DM, A-fib, pneumonia

Types of Dressings

Wet-to-Dry dressings
- Gauze is inserted wet, covered with dry gauze and it dries out, then removed after adhering to surface tissue
- Typically intended for use in the debridement of devitalized tissue from a wound bed

Alginate
- A dressing made from seaweed, creating a gel form of dressing
- Best used in moderate to highly exudating wounds

Types of Dressings

Silver dressing
- Dressing impregnated with Silver – anti-microbial dressing
- Used to treat infected wounds

Foams
- Dressing produced from polyurethane, soft, open cell sheets
- These are non-adherent and can absorb large amounts of exudate
- Also available impregnated with charcoal (attracts and traps bacteria and odor) and with waterproof backing

Hydrocolloids
- Waterproof, occlusive dressing that consists of a mixture of pectin, gelatine, sodium carboxymethylcellulose and elastomers
- Creates an environment that encourages autolysis to debride wounds that are sloughing or necrotic

Hydrofiber
- Highly absorbent dressing made of 100% hydrocolloid. The hydrocolloid is spun into fibers that make a soft, non-woven fleece-like dressing that comes as a sheet or ribbon
- Used as an alternate to alginate dressing. This dressing retains a high quantity of water without releasing it, thereby forming a thick comfortable gel
Types of Dressings

- **Hydrogels**
  - Comes as a sheet or a gel
  - Sheets are used for shallow or low exuding wounds
  - Gels are used for cavities and are effective for debriding and debriding wounds.
  - Gels have a high water content which aids the rehydration of hard eschar and promotes autolysis in necrotic wounds
  - To prevent possible maceration, a secondary barrier film may be applied to peri-wound area

- **Silicone Dressings**
  - Do not adhere to skin
  - Great on fragile, thin skin
  - Used on skin tears

Types of Dressings

- **NPWT - Negative pressure wound therapy**
  - Creates an environment that promotes wound healing by secondary or tertiary intention (delayed primary by):
    - Preparing the wound bed for closure
    - Reducing edema
    - Promoting granulation tissue formation and perfusion
    - Removing exudate and infectious material

Advanced wound healing therapy

Skin Tears

- Seen mostly in older patients – skin becomes thinner as we age
- Address medications and co-morbidities
- Surrounding edema will affect healing as well
- Treatment
  1. Stop bleeding
  2. Attempt to approximate skin edges
  3. Don’t cause additional trauma to surrounding skin
  4. Can take up to 4 weeks to heal
Hemostasis

- Achieving hemostasis can be hard, especially if patients are on anti-coagulants such as Coumadin or Plavix or if they are on steroids
- May need products such as Surgicel or other agents that help prevent formation of hematoma

Approximating Skin Edges

- If skin edges or skin flap remains, attempt to approximate
- Apply skin prep first (or Benzoin) to skin flap and intact skin
- Hold in place with steri-strips, leaving a space between each steri-strip to allow for drainage
- Cover with silicone dressing (Mepitel) that helps absorb drainage and is less traumatic
- Use Telfa, covered with Kerlix or Cling and stockinette (great for use on extremities)

Additional Thoughts

- Treat with antibiotic or antimicrobial if concerned about infection or contamination
- Don’t apply a transparent dressing such as op-site
- Once evaluated, leave area alone for 5 days
- May use xeroform as last resort

Complications

- Skin flap doesn’t take
  - Debride the area and treat as an open wound
- Hematoma
  - Evaluate if it needs to be evacuated
Additional Dressings

- Polymem – surfactant and glycerine dressing that won’t stick to the wound
  - Can be left on for 7 days
  - Ok to shower with dressing in place
  - Good for contaminated wounds to keep the wound clean
- Ointments – apply antibiotic ointment if concerned about infection
  - Bacitracin ointment on the face
  - Triple antibiotic ointment on all other surfaces
  - Cover with Telfa, silicone dressing or Polymem

Hematomas

To evacuate or not??

- Need to really look at co-morbid diseases
- Hematomas are a breeding ground for bacteria; however, evacuating a hematoma leaves an open wound and bleeding may persist if patient remains on anti-coagulant

When not evacuating wound

- Silicone or antibiotic silicone dressing can be used and it won’t disrupt the hematoma but still allows for close monitoring
- Cover the silicone dressing with a foam or padded dressing to help protect the hematoma
- Patients must be monitored very closely
- It will take time for the hematoma to be reabsorbed

Evacuation

- If eschar is forming then the wound will need to be evacuated
- If wound is evacuated, you must see the base of the wound to fully evaluate it
- Apply pressure if bleeding continues once hematoma is evacuated
- May need to use products such as coban to assist with applying pressure
Additional Problems with Hematomas
- Older patients may have vascular insufficiency adding to edema and decreased oxygenation to the tissues causing stagnant blood
  - Especially seen in patient with renal failure and vascular insufficiency
- Antibiotics
  - Don’t recommend antibiotics unless signs of infection or contaminated process such as wound occurred in dirt (think fungus or yeast)
  - Suggest using Augmentin or Bactrim
  - Keflex is not a good option on soft tissue, especially on lower extremity wounds

Diabetic Foot Ulcers

Diabetic Ulcers
- Never what they appear, always look benign
- Usually associated with other underlying diseases that affect healing such as PVD and arterial disease
- For this reason, must always assess vascularity leading to wounds
- If there is no blood flow under wound, it WON’T heal

Assessing Diabetic Ulcers
- Always do 3 view x-ray or MRI (especially of foot) to r/o osteomyelitis. If unable to get one of these imaging studies, get bone scan
- Always probe wound
  - The inflammatory process is usually delayed resulting in possible undermining, tunneling, fluid collections or edema
Treatment of Diabetic Ulcers
- Always evaluate shoes!
  - Inside and out
  - Look for dirt, foreign bodies, etc.
- Perform neuro exam
- Off-load foot. May need to add foam to shoes.
- Limb salvage – Refer directly to a podiatrist if you do not see signs of healing (partner with a podiatrist to help treat these types of wounds)
- Wound may need to be incised and drained

Treatment continued
- Treat wound with antimicrobial agents
- Hydrofiber, alginate or anti-microbial gels
- Evaluate for proper management of DM
- If you see signs/symptoms of infection, refer out to vascular, podiatry, ID, etc.
- If no evidence of infection, may treat for 3-4 wks before referring to podiatry

Recalcitrant Wounds
- Biofilm can develop and nothing can impregnate it keeping wound in the inflammatory stage
- Wound will need sharp debridement
- Evolving field – Lab in Texas will tailor treatment based on tissue specimen, genetics, bloodwork and location of wound

Pressure Ulcers
Pressure Ulcers

- Currently classified into 4 stages
  - Discussions to change classification to suspected deep tissue injury
- Stage 1 and Stage 2
  - More from shearing and friction
- Stage 3 and Stage 4
  - Deep tissue injury
  - Suspect deep tissue injury if dark red/purple/maroon, hard/bony surface, won’t blanche

Pressure Ulcers
Stages 1 and 2

- Early stages may start to evolve
- Will start to look diffuse with edges not well defined. Pink edges, purple area may open up and evolve to an open wound stage ulcer

Treatment of Pressure Ulcers
Stage 1 and 2

- Always off-load
- Observe frequently
- Silicone products will off-load and absorbs drainage
  - Some wounds may heal with silicone alone
- May also use hydrocolloids (DuoDerm) or Foam dressings

Considerations with Treatment

- What is the causative agent of the ulcer?
- Nutrition status?
  - May need to add Ensure, Megace or tube feedings
- Hydration?
  - Is the patient dehydrated?
- UTI?
- Frequent pneumonia?
- Local care is needed to heal wound but must also find the underlying cause and address it
- There may be a short term cause such as a fracture but if there is no short term cause, need to find the reason for the ulcer
Pressure Ulcers
Stage 3, Stage 4 and Unstageable

Stage 3
Stage 4
Unstageable

Treatment of Pressure Ulcers
Stage 3 and 4

- Clean wound bed
- Surgical debridement
- Autolytic debridement (hydrocolloids)
- Transparent dressings (op-sites) – soften up eschar to allow for debridement later
- Medical grade honey if no bee allergy (Manuka Honey - Medline)
- Hypertonic solution/pad can be used for sloughing wound – will withdraw fluid and debride wound
- If odorous, use ¼ strength Dakin’s solution on gauze. This will improve odor and debrides. Use for about 3-4 days.

Treatment of Pressure Ulcers
Stage 3 and 4

- Always protect periwound skin with ointment (moisture retentive) to protect healthy skin from maceration from excessive drainage
  - Calmoseptine or A&D ointment
- Apply ointment under foam or ABD pad that will allow the drainage to be soaked up
- Can use fiber type fillers such as alginate or hydrofiber to fill dead space

Abscess
Abscesses
- If patient thinks it is a spider bite, always I&D, open wound and pack
  - Must be drained
  - Likely MRSA or Staph
- Skin pops
  - Iodosorb gel or Cadoximer Iodine for treatment
  - Easy for patient to do themselves and protects against many organisms
  - Sustained released of orange fluid, placed on wound bed and absorbs drainage
  - Comes in a tube that is applied to wounds by patient
  - Ok to shower

Road Rash
- Must be very diligent to scrub all debris from wound within first 24 hours
  - If debris is not removed, patient will get tattoo from wound
- Shower daily with CHG (Chlorhexadine Gluconate) for 2 weeks
- Apply Xeroform over the area then a gel pad
  - This will absorb the fluid and is more comfortable for the patient because it deters dressing from sticking and dressing changes will be less frequent

Other Wound Care
- Dakins solution
  - Used for malodorous, soupy wounds with stringy/yellow debris
  - Or used if you suspect pseudomonas (greenish appearance to wound or drainage)
- Non-healing wounds
  - Always need biopsy to r/o SCC or other possible inflammatory process
NPWT (Wound Vac)

- Used for treatment of open wounds
- Negative pressure therapy
- Controls edema and provides support to incision/wound
- Improves healing and decreases treatment time

Creates an environment that promotes wound healing

**Microstrain**
- Reduces edema
- Promotes perfusion
- Promotes granulation tissue formation
- Cell mitosis/proliferation
- Fibroblast migration

**Macrostrain**
- Draws wound edges together
- Removes exudate
- Removes infectious materials

Types of Wounds

- Chronic
- Acute
- Traumatic
- Subacute
- Dehisced Wounds
- Partial-Thickness Burns
- Ulcers (such as diabetic, pressure, Venous)
- Flaps and Grafts

VAC Dressing Types

- **V.A.C.® Granufoam Dressing**
  - Reticulated (open) pore Polyurethane ideal for:
    - Deep acute wounds
    - Traumatic wounds
    - Diabetic & Pressure ulcers
    - Draining or dry wounds
    - Flaps and grafts (with non-adherent)

- **V.A.C.® White Foam Dressings**
  - Dense (higher tensile strength) open-pore Polyvinyl Alcohol ideal for:
    - Tunneling/tracts/undermining
    - Painful wounds
    - Wounds requiring controlled growth of granulation tissue
    - Superficial wounds
Reticulated (open) celled Polyurethane micro-bonded with silver to provide a protective barrier to reduce aerobic, gram-/+ bacteria, yeast and fungi. Ideal for:
- Deep acute wounds
- Traumatic wounds
- Diabetic & Pressure ulcers
- Draining or dry wounds
- Flaps and grafts (with non-adherent)

99.9% of pathogens eliminated within the first 30 minutes

V.A.C.® GranuFoam Silver

Contraindications
- Do not place foam dressings of the V.A.C.® Therapy System directly in contact with exposed blood vessels, anastomotic sites, organs, or nerves
- Malignancy in the wound
- Untreated osteomyelitis
- Non-enteric and unexplored fistulas
- Necrotic tissue with eschar present (after debridement V.A.C.® Therapy may be used)
- Sensitivity to silver

Warnings, Precautions and Safety Tips
- **Protect Vessels and Organs:** All exposed or superficial vessels and organs in or around the wound must be completely covered and protected prior to the administration of V.A.C.® Therapy
- **Protect Tendons, Ligaments and Nerves:** Tendons, ligaments and nerves should be protected to avoid direct contact with V.A.C.® Foam Dressings. These structures may be covered with natural tissue, meshed non-adherent material, or bio-engineered tissue to help minimize risk of desiccation or injury
**Warnings, Precautions and Safety Tips**

- **V.A.C. Therapy On:** Never leave a V.A.C.® Dressing in place without active V.A.C.® Therapy for more than 2 hours. If therapy is off for more than 2 hours, remove the old dressing and irrigate the wound. Either apply a new V.A.C.® Dressing from an unopened sterile package and restart V.A.C.® Therapy, or apply an alternative dressing at the direction of the treating clinician.

- **Bleeding:** With or without using V.A.C.® Therapy, certain patients are at high risk of bleeding complications.

- **1000 mL Canister:** DO NOT USE the 1000 mL canister on patients with a high risk of bleeding or on patients unable to tolerate a large loss of fluid volume.

- **MRI, X-Ray & HBO**

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**Dressing Application**

- **Target Pressure:** 125 mmHg (125-175 white foam)
  - Continuous first 48 hrs
  - Intermittent if tolerated
  - Dressing change every 48-72 hrs

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**Basic Dressing**

- **Target Pressure:** 125 mmHg
  - (125-175 white foam)

**Tunneling: White foam and GranuFoam**

- **Target Pressure:** 125 mmHg
  - (125-175 white foam)
  - Continuous
  - Dressing change every 48-72 hrs
Framing: Wounds with Small Openings

Target Pressure 125 mmHg
(125-175 white foam)
Continuous first 48 hrs
Intermittent if tolerated
Dressing change every 48-72 hrs

Bridging

Resources
KCI Advantage Center
1-800-275-4524
24/7

Reps On-Call

Territory Manager

Service Consultants

References