Essential 5: Wound Bed Optimization...Topical Wound Care

Managing The Wound Micro Environment

“I told you if you kept picking, they’d cover it up more”
Essential 5: Wound Bed Optimization...Topical Wound Care

Goal of this presentation: Attendees will be able to apply an evidence based algorithm for the application of topical products in wound care.

Objectives:
1. Attendees will know the categories of topical wound care products based upon characteristics and impact on specific surface impediments to wound healing.
2. Attendees will be able to select topical wound care products on the basis of specific characteristics of the wound bed and surrounding skin.
3. Attendees will understand the potential hazards of some topical wound care products when exposed to hyperbaric oxygen.
Product and Technology Recommendations

- It is the policy of Diversified Clinical Services, Inc. (“DCS”) to be product neutral. DCS does not endorse or dictate the use of any particular brand of wound care products. Any references in the Clinical Practice Guidelines (“CPG’s”) to a specific product by name brand is done only because the product is patented and there is no generic name that can be used to reference a product type or group. DCS shall update product references at the time reprints or updates of the CPG’s are issued.”
Essential Step 5
Managing the Wound Microenvironment

- Wound bed too dry...intervene to increase moisture W05.05
- Is the wound microenvironment conducive to healing? W05.05
- Wound bed too moist or maceration present...intervene to manage exudate and surrounding skin W05.05
- Continue Assessment
Dressing Goals
(The Joint Commission Patient Safety Standards)

The right dressing
The right wound
The right patient
The right time
THE IDEAL DRESSING...

THE RULE IS TO KEEP THE WOUND BED MOIST AND SURROUNDING TISSUE DRY
Wound Care Product Companies

- Coloplast
- Smith & Nephew
- Medline
- Systagenex (formally Johnson & Johnson)
- Healthpoint
- ConvaTec
- DeRoyal
- Molnlycke
- 3M
- Hollister

DOES YOUR HOSPITAL USE A BUYING SERVICE OR HAVE A PREFERRED PROVIDER AGREEMENT?
Components of Wound Assessment

- Eschar
- Slough/Fibrin/Necrotic Tissue
- Wound Base Color
- Granulation Tissue
- Exposed Features (bone, muscle, tendon, ligament, joint)
- Tunneling or Undermining
- Drainage Amount (none to large)
- Drainage Color
- Epithelium
- Peri-Wound Integrity
Dry or Desiccated

NO Eschar
NO Exposed Features
NO Drainage
Peri Wound Dry
GOAL
Hydrate Wound
If perfusion adequate

CONDITION -
Dry or Desiccated Wound

OPTIONS -
Hydrogel/Sheets
Hydrogel Gauze
Saline Gauze

Decisions for Dressing Applications
Hydrogels
Curasol, DuoDERM gel, Hypergel, TegaDerm Gel, Intrasite Gel

- Clear, viscous gel made up of combination of water and glycerin
- Viscosity will depend on greater % of glycerin
- Help maintain a moist healing environment
Hydrogel Sheet
Aquasorb, Flexgel, Skintegrity

- Used on dry wounds or when moisture is required for comfort or cushion.
- Can provide moisture over longer periods.
- Little absorptive qualities.
- Change every 1-2 days.
Hydrogel - Advantages

- Re-hydrate the wound bed
- Soothing
- Help reduce pain
- Longer wear time than damp gauze
- Easy to apply and remove
- Comes in different forms
- In gauze form can be used to fill wounds
- Does not leave residue in wounds
- Facilitates Autolytic debridement
Hydrogel - Disadvantages

- May break down in wound bed -- will depend on viscosity for wear time
- Limited absorption
- May cause maceration if exudate increases
- Usually requires a secondary dressing
Minimal Drainage

Fibrin
Granulation Tissue
No Exposed Features
Scant to Small Drainage
Peri Wound- Intact
GOAL - Maintain Adequate Hydration/Moisture

CONDITION - Minimally Draining Wound

Decisions for Dressing Applications

OPTIONS -
- Hydrogel Hydrogel Gauze
- Saline Gauze
- Film Dressing
- Hydrocolloid
Films
Opsite, Suresite, Tegaderm

- Possess high adherence properties.
- Nonabsorbant.
- Avoid use on fragile tissue.
Films Advantages

- Act as cover dressing and may be left in place for several days
- Apply over gauze dressings to act as a waterproof covering
- One-piece dressing, no need for tape
- Creates a moist wound environment that softens thin areas of eschar and/or slough
- Covers recently epithelialized areas
- Protects from external contamination (bacteria, urine, and stool)
- Allows for wound visualization
Films Disadvantages

- Not an absorptive dressing if left on too long over exudate, may cause maceration
- When wrinkled, may lift up sooner and allow leakage of fluid
- Traumatic on removal of fragile skin
- Contraindicated with cavity wounds, undermining or tunneling unless wound is filled with packing material
- Do not use if clinical signs of infection present
Vapour Permeable Films
Hydrocolloids
Comfeel, DuoDerm, Exuderm, Restore, Tegasorb

- Hydrocolloid dressings contain a dressing matrix which absorbs exudate and creates a gel-like dressing.
- For low to moderate exudating wounds.
- Avoid on skin tears, diabetic foot ulcers, intact blisters, or areas that require frequent dressing changes.
- Change every 3-7 days.
- Does have an odor when it breaks down.
Hydrocolloid Advantages

- Waterproof and may prevent contamination
- Somewhat absorptive
- Flexible and conformable
- Long wear time
- Ease of use
- Does not usually require secondary dressing
- Promotes Autolytic debridment
Hydrocolloid Disadvantages

• Risk of hypergranulation tissue
• Break down in wound
• Occlusion and odor
• Could mistakenly think the wound is infected.
• Can be dislodged in the presence of heavy exudate
• May damage fragile periwound skin
• Not for wounds with undermining or tunneling
• Not for heavily draining wounds
HYDROCOLLOID DRESSINGS
Necrotic Tissue
Exposed Muscle
Moderate Drainage
Peri-Wound - Macerated

Moderate to Heavy Drainage
CONDITION - Moderate to Heavy Draining Wound

Decisions for Dressing Applications

GOAL - Absorb Drainage Moisture

OPTIONS - Alginites Foams Absorptive Dressings Pouching Technique NPWT – Vac Closure
Alginate dressings are considered to be primary dressings for wounds that have moderate to heavy exudate and transudate.

Alginate, once wet with exudate, forms a gel-like plug in the wound.

Alginates can absorb up to 20 times its weight in exudate.

It facilitates autolytic debridement of the wound.
Alginate

• Moderate to highly exudating wounds.
• Requires secondary dressing, such as a biocclusive thin film, a hydrogel sheet, or gauze.
• Change when exudate visible on secondary dressing.
• If dressing particle remain in wound bed, may irrigate them out with normal saline.
• Do not use on dry wound bed.
Alginate Advantages

• High capacity for absorption
• Easy to apply
• May be used under compression
• Forms a gel like substance when in contact with wound exudate to maintain moist wound environment
Alginate Disadvantages

- May desiccate a wound bed if used inappropriately
- May cause maceration to periwound skin if absorption capability is not enough
- Gel like substance may break down upon removal from wound bed
Hydrofiber

- Use for highly exudating wounds.
- In sheets or ropes.
- As fibers absorb, they convert into a gel that provide a moist environment as absorption continues.
- Requires a secondary dressing.
- Lift from wound bed in one piece.
Absorption and Conformity
Foams
Allevyn, Biatain, Gentleheal, Mepilex, Optifoam, Polyderm
Foams

- Foam dressings are highly absorbent primary dressings made of a hydrophilic polyurethane foam.
- Foam dressings keep a moist wound environment but absorb the excess exudate.
- Foam dressings are useful for cavitating wounds because they can be placed in the wound to fill the wound bed while absorbing the continuous exudate.
- Foam dressings placed in deep wounds can remain for 3-4 days but must be secured in place by a bio-occlusive type dressing.
- Some of the foam dressing products have an adhesive backing at the margins of the dressing and therefore these cannot be packed into deep wounds.
- Foam dressings with adhesive backings are very useful for placing over wounds smaller than the absolute diameter of the dressing.
Foam Advantages

- Absorb under compression
- Insulator for wound
- Easy to apply
- Adhesive foams leave no residue
- Gentle on friable skin
- Does not adhere to wound bed
Foam Disadvantages

• If used inappropriately, may dry out wound bed
• May lead to maceration of periwound skin if left in place too long
• Some foams may require a secondary dressing
DCS CPG: W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control

W05.01 Figure 1. Assess Wound Moisture Balance

Assess Wound Moisture Balance

Condition

- Dry or Dissicated
  - NO
  - YES: Hydrate (If Perfusion Adequate)

Goal of Care

- Maintain Adequate Hydration/Moisture
  - NO
  - YES: Absorb Drainage/Moisture

Options

- Hydrogel
- Hydrogel Gauze
- Hydrogel Wafer
- Saline Gauze
- Film Dressing
- Hydrocolloid
- Alginate Foam
- Cellulose
- Ceramic Fiber Pouching
- Petrolatum
- Dressing Barriers
- Films
- Hydrocolloids
- Ceramic Fibers
- Celullous
- NPWT (VAC®, Gauze?)

Moisture Barriers
- Zinc Oxide
- Dimethicone
- Petrolatum
- Dressing Barriers
- Films
- Hydrocolloids
- Ceramic Fibers
- Celullous
- NPWT (VAC®, Gauze?)

Silver Based Dressings

Topical Antiseptics
- Iodine Dressings
- Silver Dressings
- Debridement (Systemic Antibiotics)

Activated Charcoal
- Iodosorb
- Multidex
- Topical Metronidazole

Hydrate or Restore Moisture Balance
- Topical Local Anesthetic Gels, Ointments
- Topical Narcotics
- Combination Therapy

W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain

Assess Microbial Balance

- No Evidence
  - Increased Burden
    - Based on Risk of Recolonization
      - Consider Prophylaxis

- Increased Burden
  - YES: Decrease Bioburden
  - NO: Control Odor Eliminate Cause

- No Abnormal Odor
  - NO: Nociceptive Pain
  - YES: Treat Underlying Cause
    - Topical Analgesia
Peri-Wound: Macerated
**GOAL** - Protect Wound Margins and Skin

**CONDITIONS** -
- Macerated Wound Edges
- Macerated Skin

**Decisions for Dressing Applications**

**GOAL** - Protect Wound Margins and Skin

**Moisture Barriers**
- Zinc Oxide
- Dimethicone
- Petrolatum

**Dressing Barriers**
- Films
- Hydrocolloids
- VAC®
Skin Care

- Skin is a natural barrier to infection
- Diabetics have microvascular changes that result in excess dryness
- Any crack is a potential source of problems
- Objective of intervention is to moisturize without maceration
- Toe spaces typically not dry
Skin Care

- General hygiene often an issue
- Exudate or weeping from wound is irritant
- Frequent cellulitis
- Nutrition, hydration, and age play a major role in skin condition
- Incontinence issues
- This is the place good nursing care plays an important role.
Cleansers
Allclenz, SAF-Clens

• Gentle cleansing of the wound, at the time of dressing change, reduces the risk of infection and wound healing is optimized.

• Dakins, betadine, acetic acid and hydrogen peroxide are cytotoxic and are contraindicated, as routine cleansers.
Normal Saline

- Optimally delivered at 8-12 psi
  1. Requires 60 cc syringe with 18 gauge angiocath
- Issues of application
- Issues of waste/cost effectiveness
- Issues of infection control
  1. Disposal of open container past 24 hours
  2. The Joint Commission Patient Safety Guidelines
Wound Cleansers

- Surfactant agents
- Wetting agents/moisturizers
- Antimicrobials agents
- Equalize normal pH of wound bed
- Spray or stream
- Less waste
- Not cytotoxic
MOISTURE BARRIER PRODUCTS

Should contain one or any or combination of:

1. ZINC OXIDE
2. PETROLATUM
3. DIMETHICONE
MOISTURE BARRIER PRODUCTS
Newly Debrided: No evidence of Increased Bioburden
GOAL – Based on Risk of Contamination – Consider Prophylaxis

CONDITIONS -
No evidence of Increased Bioburden

Decisions for Dressing Applications

OPTIONS -
Silver Based Dressings
Silver Products
Acticoat, Actisorb, Aquacel Ag, Arglaes, Silvasorb, SilverCel
Mechanism of Silver Dressings

• Characterized by the amount and nature of silver released and the properties of the agent to which the silver is bound.

• Once in the cell the silver binds to and denatures proteins, including DNA and RNA, inhibiting cell replication.
Antimicrobial Action of Topical Silver

- Silver is effective as an antimicrobial because it binds to and destroys bacteria cells at multiple sites.
- The ability to bind to several sites is the main reason why bacterial resistance to silver is rare, making silver an attractive option.

When the silver cation binds to proteins in the bacteria, the following can result:
- The protein structure is altered, causing structural and functional changes in the cell
- The bacterial cell wall can rupture, causing its contents to leak out, leading to cell death
- The bacteria is prevented from carrying out functions necessary for its survival, such as respiration and taking in nutrients, leading to cell death
- Antibiotics usually only have one method of killing bacteria (i.e. preventing replication) while silver has several methods of killing bacteria.
Antimicrobial Action of Topical Silver

Active against a wide range of bacteria & fungi

• Staphylococcus aureus
• Escherichia coli
• Pseudomonas aeruginosa
• Candida albicans
Increased Bio-burden

Necrotic Tissue
Exposed Bone, Muscle, Tendon
Increased Bio-burden
GOAL - Decrease Bioburden

CONDITION – Increased Burden

Decisions for Dressing Applications

OPTIONS –
Topical antiseptics/antibiotics
Cadexemer iodine
Silver dressings
Debridement
Systemic Antibiotics
Cadexomer Iodine Iodoflex, Iodosorb

- Cadexomer iodine based products absorb fluids, removing exudate, pus and debris. As they swell, iodine is slowly released killing micro-organisms and forming a protective gel over the wound surface.

- avoid in patients with thyroid disorders & pregnancy
Silver Products
SANTYL/COLLAGENASE

• Product Description
Santyl is a sterile enzymatic debriding ointment which contains 250 collagenase units per gram of white petrolatum USP. The enzyme collagenase is derived from the fermentation by Clostridium histolyticum.
Debridement to Remove Bioburden
No Odor
GOAL
Control Odor
Eliminate Cause

CONDITION – abnormal odor

Decisions for Dressing Applications

OPTIONS –
Activated Charcoal
Iodosorb
Multidex
Metronidazole
Multidextran Polysaccharide Gel or Powder

- **Multidex (DeRoyal)**
  1. Monosaccharides and polysaccharides derived from plant starches
  2. 1% ascorbic acid
  3. Molecular weight prevents systemic absorption of starches
  4. Heals by adding topical nutrients and creating osmotic effect of glucose to PMN (polymorphonuclear cells)
  5. Indicated on both infected and non-infected wounds including
Controlling Odor in Wounds

Activated Charcoal

• Activated Charcoal Dressings contain a layer of activated charcoal that traps volatile, odor containing molecules, thereby containing the smell.
• Example: CarboFlex- Convetyec

Metronidazole (Flagyl)

• Metronidazole is an antibiotic effective against anaerobic bacteria and certain parasites.
CONDITION –
Nocioceptive Pain (Pain associated with damaged tissue)

Decisions for Dressing Applications

GOAL
Treat underlying cause
Topical analgesia

OPTIONS –
Restore moisture balance
Topical local anesthetic gels
Topical Narcotics
Combination Therapy
Additional Dressings
Additional Dressings

- **Hydrofera Blue (HealthPoint)**-
  1. Methylene Blue and Gentian Violet
  2. Provides broad spectrum bacteriostatic protection, Effective against MRSA & VRE,
  3. Provide some odor control properties

- Moisten with sterile $\text{H}_2\text{O}$ or saline
- Comes in various sizes, including squares and 9 & 12 mm tunnel dressings
Additional Dressings

MediHoney

1. Polysaccharides derived from Manuka Honey
2. Molecular weight prevents systemic absorption of starches
3. Mode of action, works by adding topical nutrients and creating osmotic effect of glucose.
4. Indicated on both infected and non-infected wounds including
Additional Dressings

Cellulose/Collagen

Promogran (Systagenix)

1. 45% oxidized regenerated cellulose, 55% collagen biopolymer

2. Binds matrix metalloproteases with tissue growth factors in chronic wound exudate

3. Heals by providing an environment which attracts cells and limits the proteases (MMP) that inactivate growth factors.
PROMOGRAN PRISMA™ (Systagenex)

- Collagen, oxidized regenerated cellulose (ORC) and silver-ORC††
- Kills clinically relevant bacteria in the dressing to help maintain bacterial balance and reduces bacterial growth
When All Else Fails. . . . .
Dressing Choices for Hyperbaric Therapy Patient

Approved dressing items for use in the Hyperbaric Chamber (DCS Policy D415)

• Tubular net bandage, Tube gauze
• Dry gauzes, pads, foams and sponges
• Acticote™ silver dressing, Acticote 7™
• Cast—fiberglass or plaster that has been set greater than 10 hours
• Pads, foams and sponges containing water based hydrating gels
• Safe-Gel® (hydrating dermal wound dressing with alginate)
• Stoma bags with standard dry adhesives and putties and water based liquid sealers after dry
• Liquid stoma sealer with hexane base once completely cured
• Adaptic™, Vaseline® petrolatum gauze and Xeroform™ petrolatum dressing
• Silvadene, Thermazene Cream™
• Other jellies, gels and pastes that do not contain alcohols or other potentially flammable material, if approved.
• Hydrofera Blue
Dressing Choices for Hyperbaric Therapy Patient

Dressing items not allowed in the Hyperbaric Chamber

• Dressings with velcro or metal clasp fasteners.
• Alcohol wipes or swabs.
• Casting Materials less than 10 hours from application
• Any dressing or material that may emit a fume or gas that could be considered combustable.
• When in doubt contact your Hyperbaric Safety Director, DCS Safety Committee representative, or RDCO.
REMEMBER!

*Because wounds and patients evolve during the process of healing, the dressing you start with may not be the dressing you end with!!

*Don’t be afraid to adjust during the course of treatment....
Questions