Integrating Palliative and Curative Wound Care

Prevalence and type

- Pressure – 50%
- Malignant – 30%
- Venous / edematous – 10%
- Arterial – 5%
- Surgical – 5%
- Diabetic – few
- Skin Tears – ?

Outlook

- Prevalence and type
- Prevention
- Assessment, preparation, dressing
- Managing pain, odor, exudate, bleeding

How Many Wounds?

Prevalence of Wounds

NPUAP (2001)
- Hospice population 14% – 28%
- LTC and Rehab 2% – 28%
- SCI Units 10% – 30%

Tippett (2005) – 35% of 400 patients in a single hospice had a skin wound

Reifsnyder and Magee (2004) – 26.9% of 980 patients at 4 hospices had pressure ulcers

What Types of Wounds?
Integrating Palliative and Curative Wound Care

Co-morbid Disease
- Dementia
- Stroke
- Peripheral Vascular Disease
- Diabetes
- Cancer

Prevention...

Pathophysiology...
What is the root cause of all wounds?
- Pressure
- Malignant
- Venous / edematous
- Arterial
- Diabetic
- Tissue necrosis in
  - Dermis
  - Fat
  - Muscle
  - Associated structures
    - Nerves
    - Tendons
    - Vessels

Risk Assessment
Braden Pressure Ulcer Risk Assessment

<table>
<thead>
<tr>
<th>Sensory perception</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friction / shear</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

...Pathophysiology
- Wounds & surrounding tissues susceptible to
  - Infections
  - Inflammation

Pressure Relief:
Surfaces / Positioning
- Beds
  - Group 1 – Pressure relief mattress
  - Group 2 – Low air loss
  - Group 3 – Air fluidized
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Reduce Pressure, Shear, Friction and Moisture

- High pressure – short period only
- Head board < 30°
- Footboard or elevate knees
- Protect elbows/heels
- Powder of bedpans
- Incontinence plan, standards
- Positioning q 2 hours
- Weight shift q 15-30 min X 5 seconds
- Side position at 30° angle
- Pillow under calves when on back
- Assure adequate device inflation

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Assessment . . .

Assess

- Person
  - Symptoms
    - “Woundedness”
- Wound
  - Type, cause
  - Bacterial burden
- Context
  - Underlying illness(es), prognosis
  - Nutritional status

1. Disease management
   - Diagnosis
   - Date of diagnosis
   - Prognosis
   - Comorbidities

2. Physical issues
   - Pain, other symptoms
   - Level of consciousness
   - Function
   - Wounds

3. Psychological & cognitive issues
   - Anxiety
   - Delirium
   - Depression
   - Emotions

4. Social issues
   - Family relationships, roles, finances

5. Spiritual issues
   - Meaning, purpose
   - Existential beliefs
   - Hope, expectations
   - Religion
   - Rituals

6. Practical issues
   - Activities of daily living
   - Personal care
   - Household chores
   - Transportation
   - Caregiving

7. Loss, grief
   - Actual
   - Anticipated

8. End of life/Death management
   - Life closure
   - Legacy creation
   - Death

Margaret . . .

- 68 year old woman
- Metastatic lung Ca
- Spinal cord compression, paraplegia
- Cared for at home
- Nutrition good
- Loving family

Woundedness

- Patient
- Family
- Caregivers

- Dysfunction
- Dependence
- Anxiety
- Depression
- Fear
- Abandonment
- Spiritual

Assess the Wound

- Size: L – W – D
- Tunneling
- Undermining
- Color
  - Red = viable tissue
  - Yellow = slough
  - Black = eschar
- Exudate
  - Serous
  - Serosanguineous
  - Purulent
- Odor
  - Putrid
  - Fruity
- Bubbling
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How to Measure and Chart

Pressure Ulcer Staging

- Stage III – full thickness skin loss
damage or necrosis of subcutaneous tissue
not through underlying fascia
- Stage IV – full thickness skin loss
extensive damage or necrosis of muscles,
bone or supporting structures
  - Undermining
  - Sinus tracts

Margaret

- Stage III, sacral ulcer
  5 cm X 8.5 cm, undermining,
  additional 10 cm tunneling
  Color: Red, yellow, Bluish-green
  Fruity smell
- Stage II, dermal breakdown
- Goal: Healing

Pressure Ulcer Staging

- Stage I – persistent changes in a
defined area of intact skin related to
  pressure
  Red, blue or purple hues
- Stage II – partial thickness skin loss
  Epidermis and / or dermis

Management Strategies

Healable Non-Healable

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Goal of Wound Care

“The goal is to decrease the burden of the wound, while simultaneously hoping that the interventions will promote healing.”

“Hoping for the best, planning for the worst”

Liao S and Arnold R - JPM 2007

... Margaret

• Stage X, R heel ulcer
  eschar
  4 x 6 cm
• Stage III, sacral ulcer
  5 x 8 cm;
• Goal: Healing

... Goals of Care

• Protection
  Skin Integrity
• Prevention
  Pressure
  Edema
• Presence
  Body image
  Psychic distress – patient, caregivers

Goals of Care...

• Treat – wound, underlying disease
  Stabilize, ▼ progression, promote healing
  Moist interactive wound dressing
  Bacterial Burden Treatment
• Symptoms
  Exudate
  Pain
  Odor
  Bleeding

Debridement

The single most important parameter for reducing the level of bacterial contamination in the chronic wound is the removal of devitalized tissue


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Debridement

- Surgery fastest, e.g., scalpel, curette, scissors
  - Aggressive
  - Non-aggressive
- Autolytic (dressings)
- Enzymes
  - Collagenase
- Mechanical, e.g., hydrotherapy
- Maggot therapy

Wound Pain

Nociceptive pain – due to chemical, mechanical & thermal stimuli
- Wound edges
- Surrounding tissues
- Muscle sheaths
- Periosteum

Debridement . . .

REQUIRES ADVANCE PLANNING FOR PAIN

Temporal Profile

1. Acute Intermittent
   - Cyclic
     - Dressing changes
     - Turning, repositioning
   - Noncyclic
     - Sharp debridement
     - Drain removal
2. Acute Intermittent
3. Constant
   - Inflammation
   - Underlying disease

Wound Pain

Neuropathic pain – due to nerve damage, death
Hyperalgesia – due to inflammation
- Sensitizes & recruits
  - Nociceptors
  - Opioid receptors
Allodynia

Plan for Pain

- Pre-medicate with analgesics / anaesthetics
- Choose analgesics to match pain temporal profile to analgesic first order pharmacokinetics
  - Match duration of procedure to t½
  - Wait tRmax before starting procedure
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**Long Procedures**
> 1 hour
- Prolonged debridement
- Cleansing
- Dressing changes

**Short Procedures**
< 1 hour
- Cleansing
- Dressing changes
- Turning
- Repositioning

---

**Long Procedures**

<table>
<thead>
<tr>
<th>Route</th>
<th>Time to Cmax</th>
<th>Half-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>PO / PR 60 min</td>
<td>4 hr</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>SC / IM 30 min</td>
<td>4 hr</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>IV 15 min</td>
<td>4 hr</td>
</tr>
<tr>
<td>Oxycodeine</td>
<td>IV 15 min</td>
<td>4 hr</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>IV 15 min</td>
<td>4 hr</td>
</tr>
</tbody>
</table>

**Short Procedures**

<table>
<thead>
<tr>
<th>Route</th>
<th>Time to Cmax</th>
<th>Half-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl lozenges</td>
<td>Buccal 15 min</td>
<td>2.5 hr</td>
</tr>
<tr>
<td>Remifentanil</td>
<td>IV 1-3 min</td>
<td>1 min</td>
</tr>
<tr>
<td>Nitrous oxide</td>
<td>inhaled rapid</td>
<td>rapid</td>
</tr>
<tr>
<td>Ketamine</td>
<td>SC 30 min</td>
<td>1-3 hr</td>
</tr>
<tr>
<td>Ketamine</td>
<td>IV 6-10 min</td>
<td>rapid</td>
</tr>
</tbody>
</table>

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EMLA,* Eutectic Mixture of Local Anesthetics

- Lidocaine 2.5% / prilocaine 2.5% cream
- Liquid when cold, solid at room temp.
- Apply thick coat, “icing on a cake”
- Leave on 30-60 minutes
- Need complete seal eg, plastic wrap, transparent film (adhesive)

*Approved for use on open wounds in Canada / Europe, but not US FDA

Local Anesthetics

<table>
<thead>
<tr>
<th>Local Anesthetics</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lidocaine</strong></td>
<td>Amide - less allergy</td>
<td></td>
</tr>
<tr>
<td><strong>Topical</strong></td>
<td>Quick onset of action</td>
<td></td>
</tr>
<tr>
<td><strong>Injectable</strong></td>
<td>Onset 10 - 15 min</td>
<td></td>
</tr>
<tr>
<td>( t_{\text{Cmax}} = 30 - 60 \text{ min} )</td>
<td>Dose &lt; 200 mg / 24 hr</td>
<td></td>
</tr>
<tr>
<td>+ Epinephrine</td>
<td>↓ bleeding</td>
<td></td>
</tr>
</tbody>
</table>

Benzocaine (ester) is a topical sensitizer

Lidocaine Topical Solution

- 2 % (2 gm / 100 ml) or 4 % (4 gm / 100ml)
  - Spray or drip on
  - 2 % \( \rightarrow \) 10 ml = 200 mg or
  - 4 % \( \rightarrow \) 5 ml = 200 mg
- Acidic
- Buffer with sodium bicarbonate
  - 5 mL of 1 mEq / ml NaHCO\(_3\) +
  - 45 mL 2 % or 4 % lidocaine
- Test with pH paper
- Warm

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Cleansing . . .

- Hydrogen peroxide
- Sodium hypochlorite eg, Hygeol, Dakin’s
- Povidone iodine eg, Betadine
- Aniline dyes eg, Neutral Red, Crystal Violet
- Aluminum salts eg, Burow’s Solution

These agents will delay healing and decrease bacterial burden

Cleansing Technique

- Rinse
- Cleanse
- Irrigate
  - Pressure < 15 psi
  - 18 - 20 angiocatheter + 30 – 60 cc syringe
  - SALINE, SALINE, SALINE

Cleansing

Dressing . . .

- SALINE – preserved vs. unpreserved
  - Stove-top saline
    - 10 ml / 2 tsp salt in 1 liter / quart water
    - Boil 3 - 20 minutes

- Cleansers
  - Skin – bacteriocidal
  - Wound – less toxic

Moist Interactive Healing Guideline

1. Use a dressing that will keep the ulcer bed continuously moist. Wet-to-dry dressings should only be used for debridement and are not considered continuously moist saline dressings

Strength of evidence: A
- more than one random controlled trial

Ovington L. Ostomy / Wound Management 1999; 45 (Suppl. 1A): 94S-106S

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**Moist Interactive Healing**

- Increased cellular function
- Facilitate autolytic debridement
- Lower infection rates
- Decreased pain

**Foams**

- Absorbency: ++++
- Wear time: 1 to 7 days
- Comments:
  * Need moisture from the wound
  * May macerate surrounding skin

**Moist Interactive Healing Guideline**

2. Use clinical judgment to select a type of moist wound dressing suitable for an ulcer. Studies of different types of moist wound dressings showed no differences in pressure ulcer healing outcomes

*Strength of evidence: A*

- more than one random controlled trial

Ovington L. Ostomy / Wound Management 1999; 45 (Suppl. 1A): 945-1065

**Types of Dressings**

- Foams
- Calcium Alginate
- Hydrogels
- Hydrocolloids
- Transparent Films
- Gauze
- Non-adherent

**Calcium Alginate**

- Absorbency: +++
- Wear time: 12 to 48 hours
- Comments:
  * Hemostasis
  * Can be used in infected wounds
  * Rope - wicks vertically
  * Wafer - wicks laterally

---

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**Hydrogels**

- Absorbency: ++
- Wear Time: 12 to 72 hours
- Comments:
  - * Lattice - saline propylene glycol hydrocolloid
  - * Good autolytic debridement
  - * Amorphous & sheet forms

**Hydrocolloids**

- Absorbency: +
- Wear Time: 2 to 7 days
- Comments:
  - * Not vascular insufficiency / infection
  - * Must have seal
  - * Good autolytic debridement
- Components:
  - * Hydrophilic - gelatin, pectin
  - * Hydrophobic - cellulose
  - * Adhesive - can cause allergy

**Transparent Films**

- Absorbency: 0
- Wear Time: 1 to 7 days
- Comments:
  - * Adhesive forms may damage surrounding skin
  - * Cannot have leakage channels
  - * Best re-epithelialization / protection
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Dressing Summary

- Foams
- Calcium Alginate
- Hydrogels
- Hydrocolloids
- Transparent Films
- Gauze
- Non-adherent

Gauze

- Cotton mesh
- Kerlix
- 4x4’s
- Synthetic
- Kling
- Conform
- Hypertonic / Absorbing

Prepare the Wound Carefully…

Residual exudate can add to pressure and pain
- Wick exudate away from wound surface
- “Clean” the wound bed

Keep open wound warm / moist
- Wrap to keep warm
- Don’t let wound dry out
  - Dry nerve endings
  - Exposure to air

PAIN

...Prepare the Wound Carefully

Protect skin margins and surrounding tissues with barrier films & creams
- Polymer solutions form a uniform film when applied to the skin
- Protect intact and damaged skin from irritation and drainage
- Allow moisture-vapor permeability
- Prolonged peri-wound inflammation results in a edematous, hemorrhagic granulation tissue

Non-adherent

- Non-impregnated
  - Adaptic
  - Telfa
  - Soft silicones
- Impregnated
  - Vaseline gauze
  - Xeroform

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Dress the Wound Carefully

**Use dressings that**
- Protect the wound from pressure – pack lightly
- Insulate the wound
- Remove drainage from the peri-wound surface
- Adhere to healthy tissue, not to the wound

**Dressings that attach to the wound bed**
- Pain
  - Pulling the tissue inside the wound is very painful
  - Traumatic inflammatory response reoccurs

- Topical Opioids

  **Morphine Pharmacology**
  - Water soluble
  - Does not cross intact dermis significantly
  - Easily absorbed through wound bed
  
  **Formulation**
  - 1 – 10 mg morphine / ml hydrogel (0.1 – 1%)
  - Apply to open wound every dressing change
  - Frequently produces effective analgesia until next dressing change

Choose Least Traumatic Dressings

<table>
<thead>
<tr>
<th>Dressing Type</th>
<th>Traumatic</th>
<th>Occasionally &amp; regularly causes pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gelatin gauze</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Film dressing</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Hydrocolloids</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Low adherent dressing</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Foam dressing</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Alginates</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Povidone resin dressing</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Hydrocolloids</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Hydrogel</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Soft silicone products</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Others</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- Topical Opioids

- Pathophysiology
  - The inflammatory process recruits and sensitizes peripheral opioid receptors

- Neurpathic Wound Pain
  - Occurs frequently in wounds due to ischemia, nerve damage

  **Adrenergic / serotonergic agonist**
  - Amitriptyline, nortriptyline, imipramine, desipramine

  **NMDA antagonist**
  - Methadone, ketamine

  **Ca channel blocker**
  - Gabapentin, pregabalin

  **SNRI**
  - Duloxetine, venlafaxine

  **GABA agonist**
  - Baclofen

- Dressings for Packing

  - Fill dead space
  - Moisture balance
  - Non-toxic to cells
  - Bacterial balance
  - Pain control
  - Minimize pressure

  - Not saline-soaked gauze
  - Vaseline covered gauze
  - Alginates

Dykes, J Wound Care, 2001
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Minimize Trauma During Dressing Removal

Before a dressing change
- Inquire if the patient has a preferred method to remove tape/dressing?
- Inform the patient to ask for a “timeout” during the procedure

Soak Dressings Off: Saline or gentle wound cleanser
Warm; consider topical lidocaine

Remove Dressing & Wraps Gently

Power of Compassionate Touch

Bacterial Burden

- Anaerobes
  - Metronidazole
  - Silver sulfadiazine
- Tissue depth
  - Topical
  - Systemic
- Alginate dressings

Odor . . .

John

- 62 year old man
- 18-month Hx malignant melanoma
- Now metastatic
- Tumour didn’t respond to chemotherapy, radiation therapy
  - Declined to participate in clinical trials
- Pain well controlled

Metronidazole Gel Compounding

- US commercial product is 1% gel
- Use 1 gm metronidazole powder per
  - 100 ml (100 mg/10 ml) of hydrogel or
  - KY gel, or
- Crush 2 x 500 mg tablets per 100 ml
- May add morphine sulfate
  - 0.1 – 0.5% (1 – 5 mg/ml)

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Topical Antiseptics
- Hydrogen peroxide
- Sodium hypochlorite, e.g., Hygeol, Dakin’s
- Povidone iodine, e.g., Betadine
- Aniline dyes, e.g., Neutral Red, Crystal Violet
- Aluminum salts, e.g., Burow’s Solution

These agents will delay healing and decrease bacterial burden

Aromatherapy - Malodor
- Clean air spray
  Lemon, eucalyptus, thymus & tea tree oil
  Neutralizes odors, purifies room
  Uplifts mood
- Nasal comfort gel
  Aloe vera, chamomile, rose & sandalwood
  Used by patient or caregiver on upper lip
- Lavender room spray

Odor Control
- Decrease bacterial burden
- Ventilation
- Absorbers
  Kitty litter
  Charcoal
  Coffee grounds
  Burning flame, e.g., candle
- Alternate smells
  Aromatherapy
  Vanilla
  Vinegar (cider)
  Beware perfumes

Exudate . . .

Aromatherapy - Comfort
- Lavender
  Relaxes, calms
  Improves comfort
  Provides clean feeling
- Melissa 2 % in Eucerin Cream
  Relaxes, calms
  Effective for agitation

Exudate / Dressing Layers
1. Alginites
   Absorbent +
   Bacteriostatic
   Hemostatic
2. Foams
   Absorbent +++
3. Cotton – pads, gauze
   Hold, cover up
- Beware sticking, pain
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Bleeding . . .

Mary
- 65 year old woman
- 3-year Hx inflammatory breast cancer
- Tumor unresponsive to several chemotherapy and radiotherapy protocols
- Extensive open, areas of skin ulceration across her chest due to recurrent tumor
- Painful – at rest, with dressing changes
- Friable, oozing, occasional bleeding

Tearing of Friable Tissues
- Minimize tearing
  - Inert mesh
  - Mepitel
  - Alginates
  - Non-adherent dressings
  - Tulle
  - Petrolatum coated

Risk of Bleeding
- Alginates
- Silver nitrate
- Moh’s Paste (Zinc Chloride)
- Topical thromboplastin
  - 1,000, 5,000, 10,000 units / ampule
- Tranexamic acid
  - 500 mg / 10 ml ampule
- Reassess NSAIDs, aspirin, anticoagulants

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Acute Bleed
- Minimize dressing changes – alginates
- Goals of care, advance directives
  
Family discussion
- Pressure bandage
- Dark towels
- Sedatives – midazolam, lorazepam

Non-pharmacological Interventions
- Warmth & cold (warm towels)
- Massage, pressure, vibration
- Exercise
- Repositioning
- Immobilization
- Counter-stimulation
- Relaxation
- Imagery
- Cognitive distraction, reframing
- Education, both oral & written
- Psychotherapy
- Support groups, pastoral counseling

Summary
The best clinical practices for chronic wound care

Prevent
Treat the cause
Local wound care
Quality of life

Specific General Reviews:

www.chronicwoundcarebook.com

www.o-wm.com  www.woundsresearch.com

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