Management of Common Wounds in Long-Term Care

Wound care for the Family Physician

Henry Yu-Hin Siu, MSc, MD, CCFP (COE), IIWCC
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Faculty/Presenter Disclosure

- Faculty: Dr. Henry Siu

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  - None

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  - Dr. Henry Siu does not have potential conflicts of interest to disclose
Objectives

1) Describe the wound bed preparation paradigm and common wound care dressings

2) Understand the pathophysiology of pressure injuries, vascular leg ulcers, and skin tears

3) Develop management plans for these wounds in long-term care based on best practice guidelines
Case #1

- 85 y/o male
- PMH: DM, OP with new vertebral compression fracture, MCI
- Meds: Percocet, ASA, Metoprolol, HCTZ
- Worsening functional decline over the past 6 months
- Poor oral intake

- What do you do?
Case #2

- 85 y/o female
- Admitted with chronic leg wound that resulted from a burn from spilling hot water
- Initial improvement with dressings, and then stalled
- More friable, bleeding, painful with dressing changes

What do you do?
Wound Healing 101
### Introduction

<table>
<thead>
<tr>
<th>Phase</th>
<th>Time Frame</th>
<th>Cells involved</th>
<th>Function</th>
<th>“Damaged House” Analogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemostasis</td>
<td>Immediately</td>
<td>Platelets</td>
<td>Clotting</td>
<td>“Shutting off the gas and water supply”</td>
</tr>
<tr>
<td>Inflammation</td>
<td>Days 1-4</td>
<td>Neutrophils Macrophages</td>
<td>Phagocytosis –bacteria –necrotic tissue</td>
<td>“Demolition of remaining structure and removal of junk”</td>
</tr>
<tr>
<td>Proliferation</td>
<td>Days 4-21</td>
<td>Macrophages Lymphocytes Angiocytes Neurocytes Fibroblasts Keratinocytes</td>
<td>-Filling the defect -Re-establishing skin function Closure</td>
<td>“New structure and scaffolding being built”</td>
</tr>
<tr>
<td>Remodelling</td>
<td>Day 21 – 2 yrs</td>
<td>Fibrocytes</td>
<td>Developing tensile strength</td>
<td>“Exterior landscaping and interior decorating”</td>
</tr>
</tbody>
</table>

Introduction

- Treatment aims based on wound type:
  - Healable
    - Full healing
  - Non-healable
    - Moisture balance
    - Bacterial load reduction
    - Debriding of non-viable tissue only
  - Maintenance
    - Moisture balance
    - Bacterial load reduction
    - Debriding of non-viable tissue only
    - Reassess plan when patient/systemic factors change
“Elderly” Risk Factors

1. Skin anatomy and changes in the elderly
2. Cognitive impairment
3. Medications – e.g. prednisone, anticoagulants, immunosuppressants
4. Poor nutrition
5. Vascular insufficiency – arterial and venous
6. Medical co-morbidities: Diabetes, incontinence, OA
7. Poor mobility and falls
8. Slower healing times (in general)
9. Systems-level issues: finances, barriers to access to care
The “Elderly” Skin

- Thinning of epidermis
- Slower cell turnover
- Reduced immune response
- Altered pain response
- Xerosis (reduced sebaceous gland function)
- Impaired circulation
- Connective tissue changes that leads to reduce strength and elasticity
- “Hypermobility of the skin” due to loss of subcutaneous fat
Preparing the Wound Bed Paradigm

Person with a Chronic Wound

- Treat the Cause
  - Address causes and co-factors affecting healing

- Local Wound Care

- Patient-centred Concerns
  - Adherence to plan of care
  - Quality of life
  - Caregiver/family

- Debridement

- Inflammation or Infection Control

- Moisture Balance

Edge of the Wound

Active therapies
- Biological agents (acellular and cellular)
- Skin grafting
- Adjunctive therapies

Adapted from Sibbald RG, Orsted HL, Schultz GS, et al.6
Local Wound Care - Debridement

### Key Factors in Deciding Method of Debridement

<table>
<thead>
<tr>
<th>Factor</th>
<th>Surgical</th>
<th>Enzymatic</th>
<th>Autolytic</th>
<th>Biologic</th>
<th>Mechanical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speed</strong></td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Tissue selectivity</strong></td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td><strong>Painful wound</strong></td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Exudate</strong></td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td><strong>Infection</strong></td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Where 1 is most desirable and 5 is least desirable.

*Debriding plantar callus reduces pedal pressure by 26%*

*Remove devitalized, infected or contaminated tissue only after careful assessment*
Local Wound Care – Fibrin vs. Slough
Local Wound Care – Infection Control

• Microbiology matters!
  – Acute wounds – GP (Staph/Strep)
  – Chronic wounds – Think polymicrobial

• Osteomyelitis
  – Probing to bone: SN87%, SP91% (Lavery et al., 2007)
  – Best test is MRI, less sensitive is bone scan and Xray
  – Limited usefulness of CRP
IS THIS WOUND INFECTED?

Check the features present on examination:

<table>
<thead>
<tr>
<th>Superficial Wound Infection</th>
<th>Deep Wound Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Non-healing</td>
<td>___ Size (increased)</td>
</tr>
<tr>
<td>___ Exudate</td>
<td>___ Temperature (&gt;3°F difference between mirror location – OR 8.05 to have infection)</td>
</tr>
<tr>
<td>___ Red, friable tissue</td>
<td>___ Os (probing to bone)</td>
</tr>
<tr>
<td>___ Debris/Slough</td>
<td>___ New breakdown/New satellite sites</td>
</tr>
<tr>
<td>___ Smell</td>
<td>___ Erythema/Edema</td>
</tr>
<tr>
<td></td>
<td>___ Exudate</td>
</tr>
<tr>
<td></td>
<td>___ Smell</td>
</tr>
</tbody>
</table>

*Any 3 signs present have a SN73.3% and SP80.5% for a superficial infection

*Treatment Options:
- Topical antibiotics
- Topical antimicrobial dressings

*Any 3 signs present have a SN90% and SP69.4% for deep infection

*Treatment Options:
- Systemic antibiotics
- Dressings to help remove wound exudate and slough

Reference
## Topical Antimicrobials Useful in Wounds with Overt and Covert Infection

<table>
<thead>
<tr>
<th>Agent</th>
<th>S. aureus</th>
<th>MRSA</th>
<th>Streplococcus</th>
<th>Pseudomonas</th>
<th>Anaerobes</th>
<th>Comments</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadexomer iodine</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
<td>Also debrides. Low potential for resistance. Caution with thyroid disease.</td>
<td></td>
</tr>
<tr>
<td>Silver</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
<td>Do not use with saline. Low potential for resistance.</td>
<td>Low risk and effective</td>
</tr>
<tr>
<td>Silver sulfadiazine</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
<td>Caution with sulphonamide sensitivity.</td>
<td></td>
</tr>
<tr>
<td>Polymyxin B sulphate/Bacitracin zinc</td>
<td>+</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Bacitracin in the ointment is an allergen; the cream formulation contains the less-sensitizing gramicidin.</td>
<td></td>
</tr>
<tr>
<td>Mupirocin</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td>Reserve for MRSA and other resistant Gram+ species</td>
<td>Use selectively</td>
</tr>
<tr>
<td>Metronidazole</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td>Reserve for anaerobes and odour control. Low or no resistance of anaerobes despite systemic use.</td>
<td></td>
</tr>
<tr>
<td>Benzoyl peroxide</td>
<td>Weak</td>
<td>Weak</td>
<td>Weak</td>
<td>Weak</td>
<td></td>
<td>Large wounds. Can cause irritation and allergy.</td>
<td>Use with caution</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>+</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Reserve for oral/IV use—topical use may encourage resistance.</td>
<td></td>
</tr>
<tr>
<td>Fusidin ointment</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td>Contains lanolin (except in the cream).</td>
<td></td>
</tr>
<tr>
<td>Polymyxin B sulphate/Bacitracin zinc neomycin</td>
<td>+</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Neomycin component causes allergies, and possibly cross-sensitizes to aminoglycosides.</td>
<td></td>
</tr>
</tbody>
</table>
Local Wound Care – Moisture Balance

Good dressings should:

1. Remove excess exudate and toxins
2. Provide a moist, warm healing environment
3. Allow for appropriate gaseous exchange
4. Provide a physical barrier to protect against secondary infection
5. Be atraumatic to the wound and periwound skin
# Local Wound Care - Dressings

<table>
<thead>
<tr>
<th>Category</th>
<th>Brand Examples</th>
<th>Debridement</th>
<th>Infection Management</th>
<th>Moisture Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocolloids</td>
<td>1. Duoderm</td>
<td>+++</td>
<td>+/-</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>2. Tegasorb</td>
<td>(autolytic)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogels</td>
<td>1. Aquasorb</td>
<td>++</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>2. Intrasite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium Alginate</td>
<td>1. Kaltostat</td>
<td>++</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Hydrophilic Fibres</td>
<td>1. Aquacel</td>
<td>+</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td>Hypertonic</td>
<td>1. Mesalt</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>2. Hypergel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foams</td>
<td>1. Mepilex</td>
<td>-</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>2. Allevyn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimicrobials</td>
<td>1. Aquacel Ag</td>
<td>+</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>2. Iodosorb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Medi-honey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Inadine</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Local Wound Care – Edge of the Wound

• Adjuvant therapies
  • Requires a wound care or infectious disease specialist referral
  • E.g. Electrostimulation, Ultrasound, Hyperbaric oxygen, UV Light, Negative pressure therapy
Wound Assessment

- Location
- Size (length, width depth)
- Wound bed characteristics
- Type and amount of exudate
- Integrity of surrounding skin
- Signs and symptoms of infection
- Associated pain

- Stage or Categorize only if appropriate
Wound Management in LTC

• It is a collaborative, inter-professional process

• Requires buy-in and involvement from:
  • Administrators
  • LTC physician champion
  • Nursing champion
  • Dietitian, PT, OT

• Target strategic priorities of your LTC home
  • Monthly IP wound care rounds
  • Clinical staff education sessions
Wound Management in LTC

Typical wounds you will be faced with...
Typical Wounds in LTC

1. Pressure injuries (ulcers) (32.5% of all LTC wounds; 6.7% of residents)

2. Vascular leg ulcers (venous, arterial and mixed) (7.1%; 1.5%)

3. Skin tears*

4. Diabetic foot ulcers*

5. Malignancies and others*
   *Lumped together under “Any Compromised Wound” (46.3% of all LTC wounds; 9.6% of residents)
Pressure Injuries – The Basics

• 33% prevalence of pressure injuries in LTC
  • Majority of Stage 1

• Recent 2016 NPUAP naming convention
  • Pressure *ulcer* to Pressure *injury*
  • Stage 1, 2, 3, 4, unstageable, deep tissue injury
  • Medical device-related pressure injury
  • Mucosal membrane pressure injury

Pressure Injuries – The Basics

• How do they occur?
  • Pressure!

• Worsening factors:
  • Shear – DOUBLES the impact of pressure!
  • Friction
  • Moisture
Pressure Injuries – The Basics

Extrinsic Factors
- Excessive Uniaxial Pressure
- Friction and Shear Forces
- Impact Injury
- Heat
- Moisture
- Posture

Intrinsic Factors
- Immobility
- Sensory Loss
- Age
- Disease
- Body Type
- Poor Nutrition

Pressure Injury
Pressure Injuries – The Basics

Common Locations of Pressure Ulcers

- Back of Head
- Shoulder Blade
- Lower Back
- Heel
- Elbow
- Between Knees and Ankles
- Ear
- Shoulder
- Hip
- Elbow
- Underside and Back of Heel
- Sacrum
- Lower Back
- Hip
- Shoulder Blade
- Lower Back
- Sacrum
- Heel

C.Lynn
Pressure Injuries
Pressure Injuries - Management

• For all pressure injuries:
  • Prevention is key!
  • OFFLOAD, OFFLOAD, OFFLOAD!
    • Good bed surface
    • Good wheelchair surface
    • Protect other ‘not obvious’ pressure points
  • Reduce SHEAR, FRICTION, EXCESS MOISTURE
  • Be wary of infection

Pressure Injuries - Management

- For Stage 1 injuries:
  - Protect the skin
    - Barrier creams, continence care
    - Acrylic dressings to reduce friction and shear

- For Stage 2-4 Pressure injuries:
  - Wound bed management
    - Moisture and infection management
    - Removal of slough
  - Dressings will vary based on the goal of the treatment
    - Alginates or hydrofibres to help absorb mild-moderate exudate
    - Foams to absorb moderate-large exudate

Vascular Ulcers – The Basics

• 70% of leg ulcers are venous in etiology
  – Other causes: mixed etiology, cancer, vasculitic ulcers
• More likely to occur in medically complex populations
• Duration of ulcers can last anywhere from 5-10 years
• Very costly to the healthcare system!
Vascular Ulcers – The Basics

Venous Leg Ulcers:
- Shallow, moist ulcers, medially located
- Associated edema, varicose veins
- Long-standing disease leads to changes in skin colour
- Venous dopplers can assess valve competence

Arterial Leg Ulcers:
- Ulcers usually ‘punched out’, usually more likely to occur at toes/fingers
- Cold legs/feet, Shiny skin, Hair loss
- Consider in people with diabetes or CVD
- Diagnosed by ABPI
Vascular Ulcers – The Basics

**Venous**
- Above medial malleoli
- Above lateral malleoli

**Arterial**
- Over toe joints
- Anterior shin
- Over malleoli
- Under heel

**Neuropathic**
- Over toe joints
- Inner side of first metatarsal head
- Under metatarsal head
- Under heel
- Over malleoli
Vascular Ulcers – The Basics
Venous Ulcers – Management

• Venous Ulcers
  • IF YOU DON'T COMPRESS, IT WON'T HEAL
  • Elevation and activation of calf muscle pump
  • Good local wound and peri-wound care
  • Rule out PAD with an ABPI before you compress

• Venous stasis disease can predispose people to chronic ulcers from skin tears and other skin injury
Venous Ulcers – Management

• Compression stockings vs. Compression bandaging
  • Stockings are maintenance – can be taken on and off
  • Bandaging are treatment – usually applied for 24-48 hrs and then changed
  • The “best” compression is compression a patient will wear

• Local wound care
  • Managing infection
  • Managing exudate and slough
  • Promoting warm, moist healing environment
# Venous Ulcers – Management

## TABLE 3

<table>
<thead>
<tr>
<th>Elastic Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pressure</strong></td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td>High</td>
</tr>
<tr>
<td>High</td>
</tr>
</tbody>
</table>

## TABLE 4

<table>
<thead>
<tr>
<th>Inelastic Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pressure</strong></td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Moderate to High</td>
</tr>
</tbody>
</table>

* While cohesive bandages do have some stretch they are best considered to be inelastic systems.
Venous Ulcers – Management

• BOTTOM LINE:
  • Elastic is better than Inelastic
  • Multicomponent better than single component
  • High compression better than low compression

• Not always practical in LTC to do high elastic compression given risk of PAD, patient-related factors, staff timing

• Consider dressings like tubigrip or zinc oxide bandage
Skin tears – The Basics

How do they occur?

• Shear
• Friction
• Blunt trauma

Risk factors in LTC

• Dependent for showering, dressing and transferring
• Immobility requiring assistance
• Poor nutrition and dehydration
• Poor cognition
• Medications
Skin tears – The Basics

Common locations:
- Upper and lower limbs
- Dorsum of hands
- Foreheads
- Sacrum

Complications:
- Pain
- Infection
- Scarring and contractures
- Risk for repeat injury
SHEAR
Types of Skin Tears

Easy as 1, 2, 3

International Skin Tear Advisory Panel Classification System - 2015

Type 1

Type 2

Type 3

International Skin Tear Advisory Panel (ISTAP) Classification System
Skin Tears - Management

• For all skin tears:
  • Ensure hemostasis and cleanse wound
  • Ensure a moist healing environment
  • Be careful of peri-wound skin!
  • Monitor for any signs of infection

• Think PREVENTION!

Skin Tears – Prevention!

- Skin hygiene and hydration
  - Managing moisture from sweating and incontinence
- Responsible bathing, transferring, correct turning, appropriate repositioning
- Good nutrition
- Appropriate clothing
  - Long sleeves, long pants, shin guards, footwear
- Environmental scan
  - Remove tripping hazards, good lighting
  - Padding furniture and equipment
- Staff and family education
Skin Tears - Management

• For Category 1 and 2 skin tears:
  • Approximate wound edges with adhesive strips or skin adhesive or clear acrylic dressing
  • Low to moderate wound exudate can be managed with clear acrylic dressing

• For Category 3 skin tears:
  • Consider non-adherent mesh as primary dressing
  • Moderate to high wound exudate can be managed with foam or calcium alginate dressings

Skin Tears - Management

- Avoid the following types of dressings
  - Iodine-based dressings – dries out the wound
  - Hydrocolloid dressings – can adhere to wound and cause increased damage with dressing changes
  - Staples and sutures for Type 1 skin tears are not recommended

- ISTAP does NOT recommend dressings be used as preventive measures

- Being an acute wound, typical closure in 7-21 days

Revisiting Case #1

FIGURE 1

Preparing the Wound Bed Paradigm

Person with a Chronic Wound

- Treat the Cause
  - Address causes and co-factors affecting healing

- Local Wound Care

- Patient-centred Concerns
  - Adherence to plan of care
  - Quality of life
  - Caregiver/family

- Debridement

- Inflammation or Infection Control

- Moisture Balance

Edge of the Wound

Active therapies
- Biological agents (acellular and cellular)
- Skin grafting
- Adjunctive therapies

Adapted from Sibbald RG, Orsted HL, Schultz GS, et al.6
Revisiting Case #2

- 85 y/o female
- Admitted with chronic leg wound that resulted from a burn from spilling hot water
- Initial improvement with dressings, and then stalled
- More friable, bleeding, painful with dressing changes

- Differential Diagnosis?
Marjolin Ulcers

- Ulcerative well-differentiated SCC that presents in an area of previously traumatized, chronically inflamed, or scarred skin
  - Generally will not spread via lymphatics
  - Always consider a biopsy in chronic non-healing wounds
  - Radiation therapy not recommended due to fear of transformation
• Prevention is key!
• Develop a local wound care team at your facility
• The wound bed preparation paradigm can help you work through a systematic management plan for any wound
• Biopsy as needed
Online Reading

Wounds Canada – Free online PDFs
Basics – Anatomy and Wound Healing
  Pressure injuries
  Skin Tears
  Surgical Wounds
Diabetic Foot Ulcers (*coming soon*)

https://www.woundscanada.ca/index.php?
option=com_content&view=article&id=110&catid=12&Itemid=724
Thank you!

Any Questions?

siuh3@mcmaster.ca