Prevention and Treatment of Pressure Ulcers

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Objectives

Know and understand:

- The morbidity and mortality associated with pressure ulcers for older adults
- The common risk factors for pressure ulcer development
- Techniques for preventing pressure ulcers
- The pressure ulcer staging system and treatment strategies for each stage
Why learn about pressure ulcers?
(Isn’t this the nurses’ problem?)

- Medicare and Medicaid do not reimburse for measures to heal hospital acquired pressure ulcers—a pressure ulcer not documented in the admitting MD note is presumed to be hospital acquired.

- Significant cause of morbidity and mortality.

- Painful for patients and distressing to families.

- An area of increasing litigation.

- The estimated annual cost of caring for pressure ulcers in the US is $11 billion.
Epidemiology

• Incidence (*wide variation*)
  • Acute care: 0.4% to 38%
  • Long-term care: 2.2% to 23.9%
  • Home care: 0% to 17%.

• Prevalence (*wide variation*)
  • Acute Care: 10% to 18%
  • Long-term care: 2.3% to 28%
  • Home care: 0% to 29%

• Much higher rate of bedsores in ICU: 8% to 40%
  • Immunocompromised
  • Immobile
  • Altered mental status
The cost of pressure ulcers

- Development of a pressure ulcer associated with 3.5-5 days average increase in hospital length of stay
- $5,000-$60,000: average cost range per incident for pressure ulcer treatment depending on severity of injury
- 50% increase in nursing costs and time with each pressure ulcer acquired.

Case study

MS is a 78 yo woman admitted to a nursing home for rehabilitation following a prolonged hospitalization following a R MCA CVA with L sided hemi-paresis. Hospital course complicated by a prolonged ICU stay for pneumonia, sepsis, CHF and a demand MI.
Case continued...

Non-ambulatory, incontinent, needs assistance with bed positioning.
Dysphagia treated with puree diet and thickened liquids, which she dislikes.
CoC with orders for a wet to dry dressing q shift to a sacral ulcer.
PMH: T2DM, CAD, CHF, COPD
Wound examination

Pressure ulcer over her sacrum. The wound bed is clean with 10% adherent slough. The fascia is involved. There is moderate thin non-purulent drainage.

Wound measurements are 3.4 x 5.0 x 1.4 cm with undermining 1.2 cm from 12-2 o’clock.

Labs: albumin 2.4; H&H 10.7/31.2; BS 192; A1C 8.2; Na 146
Why does a patient develop a pressure ulcer?
Risk Assessment: Braden or Norton/Norton Plus Scale

- Sensory
- Moisture
- Activity
- Mobility
- Nutrition
- Friction/Shear
Pressure

• Pressure ischemia theory: constant pressure sufficient to impair local blood flow to soft tissue for an extended period

• External pressure > arterial capillary pressure (32 mm Hg) to impair inflow

• External pressure > venous capillary closing pressure (8-12 mm Hg) to impede return of flow

• Constant external pressure for > 2 hrs produces irreversible changes in tissues in animal models
Pressure

- Supine
  - Sacrum, heel and occiput (40-60 mm Hg)
- Prone
  - Chest and knees (50 mm Hg)
- Sitting
  - Ischial tuberosities (100 mm Hg)

http://www.youtube.com/watch?v=hzqPbI6d1mch

• Lindan et al. (1965)
Metabolic demand theory

• Muscle has highest nutritional demands, which is thought to explain why this deeper tissue is often involved, even before involvement of the skin is apparent.
Moisture - Incontinence

- Prolonged exposure to fecal and urinary incontinence can lead to denuded tissue.

- Appearance:
  - Blistering
  - Redness
  - Partial thickness
  - NO slough
Altered Mental Status

- Patients with cognitive impairment may maintain the same position for long periods of time, exposing them to prolonged pressure.

- May perform repeated body movements, exposing them to friction and skin breakdown.
Altered Nutrition: Protein Energy Malnutrition
Found in 30-50% of hospitalized patients

- Promotes immobility, weight loss
- Impairs GI integrity, affecting absorption
- Loss of lean body mass, i.e. catabolism, switches use of amino acids to energy resource
Friction
Shearing

- Causes
  - Gravity & friction forces
  - Elevation of Head of Bed
  - Sliding down in chair
Shearing

- Shear injury will not be seen at the skin level because it happens beneath the skin.

- Shearing causes undermining and tunneling.
Most Common Location Pressure Ulcers

- Sacral/Coccyx
- Greater Trochanter
- Ischial Tuberosity
- Heel
- Lateral Malleolus
Other Locations: Devices
Device Related Pressure Ulcers
Aging changes to the skin

- Becomes thinner
- Defensive cells fewer and have reduced function
- Elastin disorganized
- Amount of collagen decreases
- Collagen fibers become stiffer
- Fewer cutaneous vessels

How do you prevent sagging?

Just eat till the wrinkles fill out!
Pressure ulcer classification

Progression of decubitis ulcer

- Skin
- Fat
- Muscle and tendon
- Bone
Stage I

- Intact skin with non-blanchable redness.
- Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.

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Management of stage I ulcers

- Pressure relief is the primary treatment.
- Transparent films made with an adhesive-coated polyurethane may be used to protect the area from further injury.
Stage II

- Partial thickness loss of dermis - shallow open ulcer with a red pink wound bed
- No slough.
- May present as a serum-filled vesicle
- May presents as a shallow ulcer without slough or bruising.

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Managing stage II ulcers

• As with the Stage I ulcer pressure relief is essential
• Hydrocolloid dressings promote moist wound healing
• Foam dressings provide a protective, moist healing environment and are available with or without an adhesive backing
Stage III

- Full thickness tissue loss.
- Subcutaneous fat may be visible
- Bone, tendon or muscle not exposed.
- Slough does not obscure the depth of tissue loss.
- Varies by anatomical location.

NPUAP 2007
Stage IV

- Full thickness tissue loss with exposed bone, tendon or muscle.
- Depth varies by anatomical location.
- Can extend into muscle and/or supporting structures
- Osteomyelitis possible.
- Exposed bone/tendon is visible or directly palpable

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Unstageable pressure ulcers

• Full thickness tissue loss
• The base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.

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Heel ulcers

Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as "the body's natural (biological) cover" and should not be removed.

NPUAP 2007
An example of deep tissue injury

- Area of discolored intact skin or blood-filled blister
- Damage of underlying soft tissue from pressure and/or shear.
- Painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.
- Difficult to detect with dark skin tones.
- Evolution of a thin blister over a dark wound bed.
- Wound may evolve and become covered by thin eschar.
- Evolution may be rapid exposing additional layers of tissue even with optimal treatment

NPUAP 2007
Management of Full Thickness Ulcers

- Zero tolerance for pressure
- Specialty mattresses to redistribute pressure
- Wheelchair cushions
- Observe for “Bottoming–out”
- Frequent position changes
- Management of exudate and infection
- Protection of healthy tissue
"I dunno. Maybe we need a new slogan."
The Wound Healing Cascade

- Four phases:
  - Homeostasis
  - Inflammation
  - Proliferation
  - Maturation

- Aging alone may affect all wound healing phases, but common diseases more powerfully impede and thus delay healing
Pressure-Reducing Support Surfaces

Use for all older persons at risk for ulcers

- **Static** - Foam, static air, gel, water, combination (less expensive)
- **Dynamic** - Alternating air, low-air-loss, or air-fluidized
  - Use if static surface is compressed to <1 inch, or high-risk patient has reactive hyperemia on a bony prominence despite use of static support
  - Potential adverse effects: dehydration, sensory deprivation, loss of muscle strength, difficulty with mobilization
Management of Full Thickness Ulcers: Support Surface

- Place at-risk persons on a pressure-redistributing mattress and chair cushion surface.
Management of Full Thickness Ulcers: Support surfaces
**Bottoming Out**

- Place your hand palm up with fingers outstretched, between the support surface and underlying surface or frame.

- Place hand palm up; Fingers outstretched

- Between the support surface and underlying surface or frame

- 1 inch of un-compressed support surface

- Various locations & positions
Management of Full Thickness Ulcers: The hole in the skin can be the tip of the iceberg.
Management of Full Thickness Ulcers: Shearing injuries

Undermining  Tunneling
Preparing the wound: debridement

- Enzymatic
- Sharp
- Biosurgical
Wound debridement: surgical

Pressure ulcer with undermining

After debridement
Choosing a dressing: managing moisture

<table>
<thead>
<tr>
<th>Dry</th>
<th>Minimal Exudate</th>
<th>Moderate Exudate</th>
<th>Heavy Exudate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use gauze impregnated with a hydrogel or a hydrogel sheet</td>
<td>Choose a Collagen Dressing or a Hydrogel</td>
<td>Choose a Calcium Alginate. This dressing goes on dry and becomes a gel</td>
<td>Choose a specialty absorptive dressing with a calcium alginate or negative pressure wound therapy</td>
</tr>
</tbody>
</table>
Wet to Dry Dressings

• Lower the temperature of wounds, reducing perfusion and slowing healing
• Do not prevent the invasion of pathogens
• Non-selective form of debridement: Epithelial cells are removed with the dressing, again increasing healing times
• Are painful to the patient

Ovington LG. Hanging wet-to-dry dressings out to dry. Home Health Nurse 2001;19;8:1–11.
Assessing for infection

<table>
<thead>
<tr>
<th>Bacterial Burden</th>
<th>Contaminated clinical signs and symptoms</th>
<th>Colonized +/- early signs of infection</th>
<th>Critically Colonized No/subtle signs and symptoms of infection</th>
<th>Local Infection Local s/s of infection</th>
<th>Systemic Infection Systemic signs of infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound clinical signs and symptoms</td>
<td>Wound progressing, Host stable</td>
<td>+/- C&amp;S wound</td>
<td>C&amp;S wound (tissue biopsy)</td>
<td>C&amp;S(tissue biopsy) wound</td>
<td>Wound and Blood cultures</td>
</tr>
<tr>
<td>Bacterial C&amp;S</td>
<td>No</td>
<td>+/- C&amp;S wound</td>
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</tr>
<tr>
<td>Topical antibiotic</td>
<td>No</td>
<td>+/-</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Systemic antibiotic</td>
<td>No</td>
<td>No</td>
<td>+/-</td>
<td>+/-</td>
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Perform a nutritional screening for every patient with a pressure ulcer

- Needs help to eat or drink
- Eats less than half of meals or snacks served
- Mouth pain or sore throat
- Dentures that don’t fit
- Trouble chewing or swallowing
- Coughing or choking while eating
- Sadness, crying spells, or withdrawal from others
- Confused, wanders, or paces
- Diabetes, chronic obstructive pulmonary disease (COPD), cancer, HIV
Nutrition

- Caloric intake of 30 to 35 kcal/kg and daily protein intake of 1.2 to 1.5 g/kg of body weight for patients who have or are at risk of pressure ulcers
- Increased protein intake in patients with non-healing wounds
- Adequate intake of any single nutrient, is not a panacea
- Elements such as zinc and vitamin C have not been shown to have benefit without deficiency
Most Important

I don't care what you think, peanuts are important!
Prevention is always better than cure

• Identify those at risk
  ▫ Elderly, immobile, confused, undernourished
• Promote mobility
  • Removed un-needed IVs and catheters
  • Consult physical and occupational therapy early
  • Write orders for ambulation
  • Avoid physical and chemical restraints where possible
• Maintain nutrition
  • Reduce dietary restrictions unless critical
  • Offer supplements
• Manage moisture, friction and shear
Treat these wounds...
Would you continue the wet-dry dressing?
78 year old woman admitted to the ICU with pneumonia
91-year-old patient with sepsis and intact skin 2 hours ago
83 year old man hospitalized with a fractured hip
Thank you!