Preventing Pressure Ulcers in Patients with Orthopaedic Conditions

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CONFLICT OF INTEREST

I hereby certify that, to the best of my knowledge, no aspect of my current personal or professional situation might reasonably be expected to affect significantly my views on the subject on which I am presenting.

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Objectives:

1. Propose risks for pressure ulcer development in orthopaedic patients.

2. Predict several evidence-based interventions to prevent and/or treat pressure ulcers in orthopaedic patients.
Are pressure ulcers (PU) a concern?

- Prevalence:
  - 2.2-25% in nursing home residents
  - 0.4-38% in acute care
  - 0-17% in home care
- Hospital LOS doubles with a pressure ulcer (Price).

- Pressure ulcers in elderly persons have also been associated with increased mortality rates.
  (Lyder CH. Pressure ulcer prevention and management. JAMA. 2003;289:223-226.)
  - 70% in patients over 70
  - 2-6 times greater mortality risk. Mortality increases 6-fold with a PU and 4-fold with a healed PU.

Are pressure ulcers a concern?

- Financial
  - CMS: In 2007, monetary penalties were attached to HAPU stage III/IV
  - Cost of HAPU-1 HAPU/@$20,900- $151,700
  - The estimated cost of treating PU is $11 billion a year.

- Regulatory
  - CMS
  - Joint Commission (JCAHO)
  - State departments of health

- Quality and outcome based reimbursement:
  - Quality measure: publicly reported
  - Magnet- NDNQI benchmark
  - Magnet accreditation
  - High reliability organizations
  - Transparency: outcomes reportable to the public

CMS Conditions

Certain conditions have been selected by CMS are:

- high cost, high volume, or both
- identified through ICD-9-CM coding as a complicating condition or major complicating condition that, when present as a secondary diagnosis at discharge, results in payment at a higher Medicare Severity-Diagnosis Related Group (MS-DRG)
- reasonably preventable through application of evidence-based guidelines
Polling Question

• Do you know what the PU rate is on your unit/organization?
  – Yes
  – No
  – I do not know

Definition

A pressure ulcer is localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. (NPUAP, 2009).

A number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated (clearly identified).

- ☑ localized injury
- ☑ over a bony prominence
- ☑ result of pressure/shear

Device related PU

Definition

A localized injury to the skin and/or underlying tissue including mucous membranes, as a result of pressure, with a history of an external medical device at the location of the ulcer that mirrors the shape of the device (Pittman, et al. J Wound Ostomy Continence Nurs. 2015;42(2):1-4).

- ☑ localized injury
- ☑ result of pressure/shear
- ☑ history of an external medical device
- ☑ mirrors the shape of the device
Etiology of Pressure Ulcers

Duration and Intensity of Pressure

Tissue Tolerance

Polling Question

• Is it important to assess your patient for their RISK of developing a HAPU?
  — Yes
  — No
  — I do not know

Essential Components of PU Prevention

1. Evaluate the individual’s clinical condition and pressure ulcer risk factors
2. Define and implement interventions that are consistent with individual needs goals and recognized standards of practice
3. Monitor and evaluate the impact of the interventions
4. Revise the approaches as appropriate (NPUAP, 2010)
The Braden Pressure Ulcer Risk Assessment Scale (completed daily by nursing) measures the risk of development of a pressure ulcer.

The patient is at risk when their Braden score is 18 or below.

6 Subscales:
- Sensory Perception
- Moisture
- Activity
- Mobility
- Nutrition
- Friction/Shear

Braden’s concepts

Extrinsic factors: Affect the skin surface
- Pressure (Sensory perception, activity, mobility)
- Moisture
- Shear/friction

Intrinsic factors: Affect the internal structure of the skin
- Nutrition
- Tissue oxygenation (Arterial pressure, interstitial blood flow, edema, pressors)
Case Example

• Case #1: 86 yo, white female, frail, osteopenic, kyphosis, admitted to the hospital after being found down at home for an unknown period of time. DX- Fx hip pending repair.

   Versus

• Case #2: 23 yo male admitted with multiple LE fractures after a motorcycle accident.

Case Examples

Add some risk factors...

Case #1: 86 yo- thin, poor nutrition, lives alone. OR time prolonged due to complications with peri-op time >4hrs. More risk? Why? Pressure is the same... but tissue tolerance may not be.

Case #2: Instead of age 23, he is 56 and a smoker and diabetic. Also-multiple return to OR for wash outs/debridement/etc. What body location would you be especially watching? Heels? Sacrum?

Pressure Ulcer Location

1. Occiput
2. Ear
3. Scapula
4. Spinous Process
5. Shoulder
6. Elbow
7. Iliac Crest
8. Sacrum/Coccyx
9. Ischial Tuberosity
10. Trochanter
11. Knee
12. Malleolus
13. Heel
14. Toe
Pressure Ulcers

Pressure Ulcer Location

- Any Skin surface subjected to excess pressure. Check skin beneath:
  - Oxygen tubing
  - Drainage tubing
  - Casts
  - Braces
  - Splints
  - Compression wraps
  - Cervical collars
  - Other medical devices

Pressure Ulcer Staging (NDNQI, 2007)

- Stage I
- Stage II
- Stage III
- Stage IV
- Unstageable
- DEEP TISSUE INJURY (DTI)
Pressure Ulcers: Stage I

Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.

The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Stage I may be difficult to detect in individuals with dark skin tones. May indicate "at risk" persons (a heralding sign of risk).
Pressure Ulcers: Stage I examples

- Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough.
- May also present as an intact or open/ruptured serum-filled blister.
- Presents as a shiny or dry shallow ulcer without slough or bruising.*
- This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration or excoriation.

* Bruising indicates suspected deep tissue injury
Stage II Pressure Ulcer: Stage II example

Pressure Ulcer: Stage II example
Pressure Ulcers: **Stage III**

- Full thickness tissue loss
- Subcutaneous fat may be visible but bone, tendon or muscle are not exposed
- Slough may be present but does not obscure the depth of tissue loss
- May include undermining and tunneling
- Bone/tendon is not visible or directly palpable

The depth of a Stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and Stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep Stage III pressure ulcers.

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**Stage III**

![Image of Stage 3 Pressure Ulcer]

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**Pressure ulcer: Stage III examples**

![Images of Stage 3 Pressure Ulcers]
Pressure ulcer: **Stage III** examples

- Heel
- Hip

Pressure Ulcers: **Stage IV**

- Full thickness tissue loss with exposed bone, tendon or muscle
- Slough or eschar may be present on some parts of the wound bed
- Often include undermining and tunneling
- The depth of a Stage IV pressure ulcer varies by anatomical location:
  - The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow.
  - Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule) making osteomyelitis possible.
- Exposed bone/tendon is visible or directly palpable

Stage IV
Pressure Ulcers: Unstageable

- Full thickness tissue loss in which 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.
- Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined.
- Stable eschar (dry, adherent, intact without erythema or fluctuance) on the heels serves as “the body’s natural (biological) cover” and should not be removed.
Unstageable Pressure ulcer: Unstageable examples

Eschar
Eschar
Slough, yellow, fibrinous debris

Reminder: to assess skin, you must remove or move the device to see underneath it.

Ulcers Caused by Medical Devices

O2 Mask
Skin breakdown at the nare from an NG Tube
ET-Tube tape
Other Possible Areas of Skin Breakdown

Suspected Deep Tissue Injury (DTI)

- Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear.
- The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.

- Deep tissue injury may be difficult to detect in individuals with dark skin tones.
  - Evolution may include a thin blister over a dark wound bed.
  - The wound may further evolve and become covered by thin eschar.
  - Evolution may be rapid exposing additional layers of tissue, even with optimal treatment.

Pressure Ulcers: Suspected DTI

Deep Tissue Injury (DTI)
Evolving DTI

DTI's often evolve into a Stage III or Stage IV pressure ulcer after debridement.

Polling Question

What category/stage pressure ulcer is this?
1. Stage III
2. Unstageable
3. Suspected Deep Tissue Injury
4. None of the above
Pressure Ulcer Prevention Interventions

1. **Pressure Redistribution**
   - Specialty Surfaces (Beds)
   - Overlays/mattresses
   - Seat cushions
   - Heel protection devices
   - Preventative dressings- foam

2. Routine repositioning

3. Nutritional support

4. Moisture management

http://www.npuap.org/resources/educational-and-clinical-resources/
http://www.npuap.org/wp-content/uploads/2012/03/NPUAP_S3I_TD.pdf
Polling Question

• Do you know what kind of support surfaces are available in your setting:

1. Yes
2. No
3. I do not know

Support Surfaces
(CMS categories for home setting)

Group 1: non-powered includes mattresses that are foam, gel, air, or water
- Mattress with foam
- Mattress with zoned air
- Foam composite- may be mixed with gel center
- Air inflated products: Overlay, seat cushions, and heel boots
- Foam cushions or boots

Group 2: powered air flotation beds, powered pressure reducing air mattresses, and non-powered advanced pressure reducing mattresses.

Group 3: Whole bed system using the circulation of filtered air through silicone beads.

Other: Immersion therapy

EBP Project- Preventative Dressings

IU Health conducted a retrospective comparative study of critical care patients in a large Level I Trauma Center who had perioperative time greater than 4 hours, open abdomen, open sternum, and/or anticipated repeated surgeries during same hospital stay.

We compared HAPU occurrence in patients six months prior to the intervention (6/1/2012- 11/30/2012) and six months post-intervention (12/1/2013- 6/1/2013).

Trial timeframe- Dec 1, 2012 through March 1, 2013
Results

- 47 patients were identified through incidence reports and HAPU monthly surveys.

- 21 (44.7%) patients fit the inclusion criteria
  - 17 (81%) pre-intervention with HAPU
  - 4 (19%) post-intervention with HAPU

Results

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<th>Data Source</th>
<th>Pre-intervention HAPU</th>
<th>Post-intervention HAPU</th>
<th>p value</th>
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<tbody>
<tr>
<td>Incidence Reports</td>
<td>5 (4%)</td>
<td>2 (3%)</td>
<td></td>
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<tr>
<td>HAPU surveys</td>
<td>12 (11%)</td>
<td>2 (2%)</td>
<td>.007</td>
</tr>
<tr>
<td>Total</td>
<td>17 (81%)</td>
<td>4 (19%)</td>
<td></td>
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</tbody>
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Pressure Ulcer Prevention Interventions

2. Routine repositioning and early mobilization
   - Reposition the lying or seated patient every 2-4 hours
   - Reposition devices routinely (≥ 2x/day)
   - Use preventative dressings to potential body locations to redistribute pressure
   - Consider ancillary sites and PU risk- OR, IR
   - Progressive mobility asap- Example- OOB as tolerated for meals, ambulate TID
Polling Question

- What keeps you from repositioning your patients?
  1. Nothing
  2. Size of patient
  3. Other more important patient care priorities
  4. Patient refusal
  5. I do not know/NA

Pressure Ulcer Prevention Interventions

3. Nutritional support
   - Screen nutritional status with valid/reliable screening instrument (Braden)
   - Consult dietician for those at risk for malnutrition or with PU
   - Recent weight loss? (≥ 5% in 30 days or ≥ 10% in 180 days).
   - Assess the individual’s ability to eat independently
   - Assess adequacy of total nutrient intake
   - Develop individualized nutrition care plan

Pressure Ulcer Prevention Interventions

4. Moisture management
   - Protect the skin from exposure to excessive moisture with a barrier product in order to reduce the risk of pressure damage.
   - Keep the skin clean and dry.
   - Develop and implement an individualized continence management plan.
   - Consider using a skin moisturizer to hydrate dry skin in order to reduce risk of skin damage.
Emerging Prevention Inventions

1. Microclimate control.
2. Prophylactic/preventative Dressings
3. Fabrics and Textiles
4. Electrical Stimulation of the Muscles for Prevention of Pressure Ulcers

Case Examples

Back to our Case examples:

Case #1: 86 yo- thin, poor nutrition, lives alone. OR time prolonged due to complications with peri-op time >4hours. More risk? Why? Pressure is the same… but tissue tolerance may not be.

Case #2: Instead of age 23, he is 56 and a smoker and diabetic. Also- multiple return to OR for wash outs/debridement/etc. What body location would you be especially watching? Heels? Sacrum?

Assessment & Documentation

Physical assessment should include a complete Integrity assessment. Include etiology of wound, if known (i.e., pressure ulcer, arterial, venous stasis, surgical, trauma, etc.).

Documentation

- **Nursing**: Physical assessment includes skin/integument assessment. Many organizations use an additional Pressure Ulcer Present on Admission (POA) Form.
- **Physician**: If a pressure ulcer is present, a Physician/NP/PA must verify its presence and description, and document in the H&P and/or Progress Note.
- **CMS**: removed any timeframe for physician documentation of pressure ulcer. If it is determined that the pressure ulcer injury occurred prior to admission, the physician may document that information and it is not coded as hospital acquired.
Can we prevent all Pressure Ulcers?

The NPUAP defined unavoidable pressure ulcers as those pressure ulcers that develop even though the provider/clinician:

1. Evaluated the individual’s clinical condition and pressure ulcer risk factors.
2. Defined and implemented interventions that are consistent with individual needs goals and recognized standards of practice.
3. Monitored and evaluated the impact of the interventions
4. Revised the approaches as appropriate

Conclusion

Pressure ulcer prevention is paramount in the care of patients in order to decrease harm and promote a safe environment of care.

Most pressure ulcers can be prevented.

You can make a difference:

- Conduct initial and frequent skin assessment
- Evaluate your patient’s risk for developing a PU
- Implement appropriate interventions
  - Pressure redistribution products
  - Repositioning and early mobilization
  - Appropriate nutrition
  - Moisture management

Be the guardian of their skin. Prevent Harm!
References