Pressure Ulcer Prevention in Pediatrics

Sandy Hagstrom, MA, RN, CNP
Ivy Booth, MN, RN, CNS
Objectives

At the completion of the self-study, the nurse will be able to:

• Identify the causes and age related risk factors of pressure ulcers
• Give at least four examples of patient risk factors which potentially could lead to a pressure ulcer
• Apply the use of the Braden Q Risk Assessment scales to own nursing practice
• Recognize the nursing role in pressure ulcer prevention, ongoing skin assessment, ulcer treatment, documentation and reporting
Pressure Ulcer

• Any lesion caused by unrelieved pressure resulting in damage of underlying tissue
• Can develop over any dependent skin surface
Significance

- Cost (human suffering, financial expense)
- Predispose patients to secondary infection
- Increase length of stay
- Stage III and IV ulcers are reportable events and become public knowledge
Incidence

• Incidence
  – 4-13% in general pediatric inpatient population
  – 16.9-53% in PICU patients
  – Up to 29.2% in hospitalized adults
• 72% of pediatric ulcers develop in PICU
• Highest risk: infants < 3 months
Pressure Ulcer Pathophysiology

Compression of soft tissue between a bony prominence and an external surface

Ischemia from obstruction of capillary blood flow caused by pressure > 32 mm Hg (capillary filling pressure)

Cells are starved of oxygen and die
Common Sites

• Pediatrics
  – Occipital region: infants and toddlers
  – Ears
  – Sacrum: children
  – Scapula
  – Associated with equipment pressing or rubbing on skin

• Adults
  – Sacrum
  – Heels
Patients at Risk

• Significant prematurity
• Critical illness, especially in patients with:
  – Edema
  – ICU length of stay >96 hours
  – Increasing PEEP
  – Not turned
• Neurologic impairments, including myelomeningocele, spinal cord injury
Patients at Risk

- Nutritional deficits
- Poor tissue perfusion or oxygenation
  - Low BP
  - Dehydration
  - Anemia
- Exposed to prolonged pressure from hospital apparatus or tubes

Gray, M (2004)
Patients at Risk

• Peripheral vascular disease
• Prolonged surgery
• Intractable pain
• Diabetes

*These risk factors are from the adult data, but are worth considering for our patients, especially adolescents.*
Braden Q Scale

• Assessment tool for evaluating risk of pressure ulcers
• Adapted from the adult Braden Scale to reflect the developmental needs of pediatric patients
Braden Q – Categories

• Intensity and duration of pressure
  – Mobility
  – Activity
  – Sensory perception

• Tolerance of the skin and supporting structures
  – Moisture
  – Friction and shear
  – Nutrition
  – Tissue perfusion and oxygenation
Braden Q – Score

- Range from 7 (highest risk) to 28 (lowest risk)
- Patients with scores <17
  - Are at risk for skin breakdown
  - Require intervention
Mobility

The ability to change and control body position

1. Completely immobile: Does not make even slight changes in body or extremity position without assistance

2. Very limited: Makes occasional slight changes in body or extremity position but unable to completely turn self independently

3. Slightly limited: Makes frequent though slight changes in body or extremity position independently

4. No limitations: Makes major and frequent changes in position without assistance
Activity
Degree of physical activity

1. **Bedfast**: Confined to bed.

2. **Chairfast**: Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted to chair or wheelchair.

3. **Walks occasionally**: Walks occasionally during day but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.

4. **All patients too young to ambulate OR walks frequently**: Walks outside room at least twice a day and inside room at least once every 2 hours during waking hours.
Sensory Perception

Ability to respond in a developmentally-appropriate way to pressure-related discomfort

1. **Completely limited**: Unresponsive (does not moan, flinch or grasp) to painful stimuli due to diminished level of consciousness or sedation, OR, limited ability to feel pain over most of body surface.

2. **Very limited**: Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness; OR has sensory impairment that limits the ability to feel pain or discomfort over half of body.
Sensory Perception
Ability to respond in a developmentally-appropriate way to pressure-related discomfort

3. Slightly limited: Responds to verbal commands, but cannot always communicate discomfort or need to be turned; OR has some sensory impairment that limits ability to feel pain or discomfort in one or two extremities.

4. No impairment: Responds to verbal commands. Has no sensory deficit that would limit ability to feel or communicate pain or discomfort.
Case Study

• M.J. is a 10-year-old girl who has ARDS and is on the oscillator.
• She is intubated, sedated and under neuromuscular blockade.
• Her nurses are repositioning her every 2 hours.
Case Study

What is her Braden Q “Mobility” score?

1 - Completely immobile
2 - Very limited
3 - Slightly limited
4 - No limitations
Case Study

Answer:
1 – Completely immobile
Moisture

Degree to which skin is exposed to moisture

1. **Constantly moist**: Skin is kept moist almost constantly by perspiration, urine, drainage, etc. Dampness is detected every time a patient is moved or turned.

2. **Very moist**: Skin is often, but not always, moist. Linen must be changed at least every 8 hours.

3. **Occasionally moist**: Skin is occasionally moist, requiring linen change every 12 hours.

4. **Rarely moist**: Skin is usually dry; routine diaper changes; linen only requires changing every 24 hours.
Friction-Shear

Friction: Occurs when skin moves against support surfaces
Shear: Occurs when skin and adjacent bony surfaces slide across one another

1. Significant problem: Spasticity, contracture, itching or agitation leads to almost constant thrashing and friction.

2. Problem: Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance.
Friction-Shear

3. **Potential problem**: Moves feebly or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relative good position in chair or bed most of the time but occasionally slides down.

4. **No apparent problem**: Able to completely lift patient during a position change; moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed at all times.
Case Study

• M.J. is being kept relatively hypothermic.
• Skin is cool and dry to touch.
• Prior to admission, she was an active child with good muscle tone.
• Since being started on sedation and neuromuscular blockade she requires frequent repositioning.
Case Study

What is her Braden Q “Moisture” score?

1 – Constantly moist
2 – Very moist
3 – Occasionally moist
4 – Rarely moist
Case Study

Answer:

4 – Rarely moist
Nutrition
Usual food intake pattern

1. **Very poor**: NPO and/or maintained on clear liquids, or IV’s for more than 5 days OR albumin <2.5 mg/dl OR never eats a complete meal. Rarely eats more than half of any food offered. Protein intake includes only 2 servings of meat or dairy products per day. Takes fluids poorly. Does not take a liquid dietary supplement.
2. **Inadequate**: Is on liquid diet or tube feedings/TPN which provide inadequate calories and mineral for age OR albumin <3 mg/dl OR rarely eats a complete meal and generally eats only half of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement.
3. **Adequate:** Is on tube feedings or TPN, which provide adequate calories and minerals for age OR eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered.
Nutrition

Usual food intake pattern

4. **Excellent:** Is on a normal diet providing adequate calories for age. For example, eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.
Tissue Perfusion & Oxygenation

1. **Extremely compromised**: Hypotensive (MAP <50 mm HG; <40 in a newborn) or the patient does not physiologically tolerate position changes.

2. **Compromised**:
   - Normotensive
   - O₂ saturation may be <95%
   - Hemoglobin may be <10 mg/dl
   - Capillary refill may be >2 seconds; serum pH is <7.4.
Tissue Perfusion & Oxygenation

3. **Adequate:**
   - Normotensive
   - \( \text{O}_2 \) saturation may be <95%
   - Hemoglobin may be 10 mg/dl
   - Capillary refill may be >2 seconds
   - Serum pH is normal.

4. **Excellent:**
   - Normotensive
   - \( \text{O}_2 \) saturation >95%
   - Normal hemoglobin
   - Capillary refill <2 seconds.

*This category is only on the Braden Q, not on the Braden.*
Case Study

• M.J. has been weaned to conventional ventilation.
• She is tolerating full enteral nutrition per NG.
• She has been normotensive.
• Hemoglobin is 9 mg/dl.
• O2 saturation has consistently been >95%.
Case Study

What is her Braden Q “Tissue Perfusion and Oxygenation” score?

1 – Extremely compromised
2 – Compromised
3 – Adequate
4 – Excellent
Case Study

Answer:
3 – Adequate
Staging Pressure Ulcers

Progression of decubitis ulcer

- Skin
- Fat
- Muscle and tendon
- Bone

ADAM
Staging Pressure Ulcers

• Staging should only be done by the Wound Ostomy Continence (WOC) nurses.
• When you document a pressure ulcer, describe it—don’t document it as a “Stage ___ pressure ulcer.”
• WOC nurses have experience and education in staging pressure ulcers—less experienced clinicians may make errors in staging, which may have legal implications.
• We are required to report Stage III and IV pressure ulcers to the MN Department of Health, which becomes public record.
• Here’s some info on staging—just as an “FYI.”
Deep Tissue Injury

- Purple or maroon localized area of discolored intact skin, OR
- Blood-filled blister due to damage of underlying soft tissue from pressure or shear
- Area may be preceded by tissue that is painful, firm, mush, boggy, warmer or cooler as compared to adjacent tissue
Stage I Pressure Ulcer

- Intact skin
- 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
Stage II Pressure Ulcer

- Partial thickness loss of epidermis
- Blistering with erythema/induration
- Wound base moist and pink
- Painful wound base
- Free of necrotic tissue
Stage III Pressure Ulcer

- Full-thickness tissue loss
- Extends through dermis to subcutaneous tissue
- May include necrotic tissue
- May include undermining and tunneling
- Wound base not painful
Stage IV Pressure Ulcer

- Deep tissue destruction
- Extends through subcutaneous tissue
- May involve muscle, joint and/or bone
- Deep tracts, sinuses and fissures usually present
- Bone may be visible at the base of the wound
- Wound base not painful
Case Study

- M.J.’s nurse notices a 2-inch by 2-inch area of non-blanching erythema over her right shoulder blade.
- The skin is intact.
Case Study

What will you do with this information?

A. Document it as a Stage I pressure ulcer, position the patient to avoid pressure on the area, and continue to monitor.

B. Document it as a Stage I pressure ulcer, position the patient to avoid pressure on the area, complete an ICare and continue to monitor.

C. Position the patient to avoid pressure on the area, obtain an MD order to consult the Wound Ostomy Continence (WOC) nurse to evaluate the patient and make recommendations.
Case Study

Answer:

C. Position the patient to avoid pressure on the area, obtain an MD order to consult the Wound Ostomy Continence (WOC) nurse to evaluate the patient and make recommendations.

- Staff nurses should not stage pressure ulcers.
- An MD order is needed for a WOC nurse consult. (See next slide for rationale.)
- An ICare should be completed for all pressure ulcers. You may either complete the ICare and describe the wound (not stage it), or, if the WOC nurse sees the patient during your shift, you can complete the ICare after she has staged the ulcer.
WOC Nurse Consults

- A physician order is now required for a WOC nurse consult.
- This ensures that the patient’s physician is aware of the patient’s skin issues.
- WOC nurses can be reimbursed for the consult when it is ordered by a physician.
Case Study

• J.B. is a 5-year-old African American boy with pneumonia who is developmentally delayed.
• Moves slightly in bed occasionally.
• Has soft wrist restraints in place to prevent him from pulling his NG tube.
Case Study

- J.B. wakes up with verbal commands, but has difficulty communicating his needs.
- Has a urinary catheter.
- Has developed diarrhea from his antibiotics.
- Requires frequent diaper changes; his nurse changes his linens about every 8 hours.
Case Study

- J.B. frequently slides down in his bed and requires two nurses to reposition him.
- Has been tolerating full calorie NG feedings without difficulty.
- Has been hemodynamically stable.
- Hemoglobin 12
- Has been difficult to maintain $O_2$ saturations >88%
Case Study

• J.B.’s nurse finds a moist, pink wound that has a small erythematous blister on his buttocks.

• J.B. cries with each diaper change.
Case Study

What is his Braden Q “Mobility” score?

1 - Completely immobile
2 - Very limited
3 - Slightly limited
4 - No limitations
Case Study

What is his Braden Q “Activity” score?

1 – Bedfast
2 – Chairfast
3 – Walks occasionally
4 – All patients too young to ambulate; OR walks frequently
Case Study

What is his Braden Q “Sensory Perception” score?

1 – Completely limited
2 – Very limited
3 – Slightly limited
4 – No impairment
Case Study

What is his Braden Q “Moisture” score?

1 – Constantly moist
2 – Very moist
3 – Occasionally moist
4 – Rarely moist
Case Study

What is his Braden Q “Friction-Shear” score?

1 – Significant problem
2 – Problem
3 – Potential problem
4 – No apparent problem
Case Study

What is his Braden Q “Nutrition” score?

1 – Very poor
2 – Inadequate
3 – Adequate
4 – Excellent
Case Study

What is his Braden Q “Tissues Perfusion & Oxygenation” score?

1 – Extremely compromised
2 – Compromised
3 – Adequate
4 – Excellent
Case Study

What is his Braden Q score?
A. 7
B. 10
C. 16
D. 23
Case Study

J.T.’s Braden Q score puts him into which risk category for skin breakdown?

A. No risk
B. At risk
Answer Key

- Mobility: 2
- Activity: 1
- Sensory perception: 3
- Moisture: 2
- Friction-shear: 2
- Nutrition: 3
- Tissue perfusion & oxygenation: 3
- Total Braden Q: 16
- Risk category: at risk
Skin Assessment

• On admission and every 8 hours
• Document on FCIS Assessment Flowsheet
• Inspect in brightest light possible
Skin Assessment

• If redness is discovered on a pressure point, relieve pressure for at least an hour and recheck.

• If still red, needs more intense pressure-reducing intervention, turning more frequently.

• For darkly pigmented skin, look for purplish/blue areas of discoloration.
Skin Assessment

Is reddened skin a pressure ulcer?

Initial redness over bony prominences is reactive hyperemia, a compensatory mechanism

• When pressure is relieved, the area becomes reddened or hyperemic as blood flows back and reperfuses the area.

• Will resolve in approximately $\frac{1}{2}$ to $\frac{3}{4}$ the amount of time that the area was exposed to pressure.

• This is a normal process and should not be misclassified as a Stage I pressure ulcer.
Assessment and Documentation

Braden Q is completed:

• Within 8 hours of admission
• Every 24 hours
• Documentation
  – FCIS Assessment Flowsheet eventually
  – Braden Q Flowsheet until available on FCIS Assessment Flowsheet

• Skin assessment and Braden Q (pressure ulcer risk) are 2 different assessments
Evidence-Based Prevention
What To Do

- Early enteral nutrition
- ↑ protein/calories
- Use of supportive bed surfaces
- Turning schedules
  - Even slight changes in position are helpful in the unstable patient
- Protection/elevation of heels off bed
- Patients on low-air-loss mattresses in turning mode must still be turned and heels suspended

Braden (2001)
Evidence-Based Prevention

What To Do

• Head-of-bed elevation to lowest degree possible to prevent shear-related pressure ulcers (<30°)
• Maximal remobilization
• Clean skin well, then dry
• Use moisture barrier
• Use lift sheet, Hover Mat
• Pad between knees/ankles

*Braden (2001)*
Evidence-Based Prevention
What Not To Do

- Massage reddened bony prominences
- Use donut-type devices
- Use drying agents on the skin
- Elevate bed $> 30^\circ$
- Believe a special mattress eliminates the need for turning
  - Pediatric patients on low air loss beds in turning mode are at increased risk for skin breakdown because they may pivot on the occiput, contributing to shear/friction
References


References


On completion of all three attached learning activities, **Pediatric Falls Prevention**, **NG Placement and Verification**, **Pressure Ulcer Prevention in Pediatric Patients**

please print and fill out the verification form (separate attachment) and place in the marked envelope located on your unit.