Protecting the Barrier

Minimizing Critical Risk Factors to Prevent Hospital Acquired Skin Injury

Kathleen M. Vollman MSN, RN, CCNS, FCCM, FAAN
Clinical Nurse Specialist/Educator/Consultant
ADVANCING NURSING
kvollman@comcast.net
Northville, Michigan

Disclosures

- Sage Products Speaker Bureau & Consultant
- Hill-Rom Speaker Bureau
- Eloquest Healthcare Speaker Bureau & Consultant
- Bard Speaker Bureau

Objectives

- Discuss strategies to identify patients at risk for skin injury
- Outline evidence-based prevention strategies for incontinence associated dermatitis and pressure ulcers
- Describe key care processes or program components leading to a successful reduction in skin injury in the ICU, and determine when and how to begin a similar improvement initiative

Advocacy Starts with Us

Florence Nightingale on:

SKIN INTEGRITY

- "It may be worth while to remark, that where there is any danger of bed-sores a blanket should never be placed under the patient. It retains damp and acts like a poultice."
- "If a patient is feverish, if a patient is faint, if he is sick after taking food, if he has a bed-sole, it is generally the fault NOT OF THE DISEASE, BUT OF THE NURSING.
- "Poisoning by the skin is no less certain than poisoning by the mouth—only it is slower in its operation."

Protect The Patient From Bad Things Happening on Your Watch

Implement Intervetional Patient Hygiene

Notes on Nursing (1860/1969)
Interventional Patient Hygiene

- Hygiene...the science and practice of the establishment and maintenance of health
- Interventional Patient Hygiene:...nursing action plan directly focused on fortifying the patients host defense through proactive use of evidence based hygiene care strategies

Incontinence Associated Dermatitis Prevention Program

INTERVENTIONAL PATIENT HYGIENE(IPH)

Oral Care/Mobility
Hand Care
Bathing & Assessment
Pressure Ulcer Prevention

Pressure Ulcer Facts

- 4th leading preventable medical error in the United States
- 2.5 million patients are treated annually in Acute Care
- NDNQI data base: critical care 7% Med-Surg: 1-3.3%
- Incidence in acute care 4.5%
- 60,000 persons die from pressure ulcer complications each yr
- ↑LOS ~ 3x longer
- National health care cost $10.5-17.8 billion dollars for 2010

Pressure Ulcers

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.

Shear & Friction

- Skin shear stress is an internal stress caused when adjacent surfaces rub across each other, which results in twisting and tearing of the underlying blood vessels and leads to tissue ischemia and localized tissue death.
- Friction is used to describe all phenomena that relate to interface properties and sliding of surfaces with respect to each other. This type of injury is often seen on the elbows or heels due to rubbing against bed sheeting and/or from re-positioning in bed.
Moisture Injury: Incontinence Associated Dermatitis

- Inflammatory response to the injury of the water-protein-lipid matrix of the skin
- Caused from prolonged exposure to urinary and fecal incontinence
- Top-down injury
- Physical signs on the perineum & buttocks
  - Erythema, swelling, oozing, vesiculation, crusting and scaling

Brown DS & Sears M, OWM 1993;39:2-26

Impact of Moisture

- Urinary and fecal incontinence are common in the acute care setting, occurring in more than one-third of hospitalized adults.
- Humidity/Moisture:
  - Strain at which the skin breaks is 4x greater with excess moisture than dry skin
  - Moisture increases the risk of shear & friction damage


Optimal Hygiene

- pH balanced (4-6.8)
  - Stable pH discourages colonization of bacteria & ↓ risk of infection
  - Bar soaps may harbor pathogenic bacteria
  - Skin pH requires 45 minutes to return to normal following a ordinary washing
  - Excessive washing/use of soap compromises the water holding capacity of the skin
  - Non-drying, lotion applied
  - Multiple steps can lead to large process variation

www.aacn.org Bath Practice Alert
Voegel D. J WOCN, 2008;35(1):84-90
**Risk Assessment on Admission, Daily, Change in Patient Condition**

- Use standard EBP risk assessment tool.
- Research has shown Risk Assessment Tools are more accurate than RN assessment alone.
- Braden Scale for Predicting Pressure Sore Risk
  - 6 subscales
  - Rated 1-4
  - Pressure on tissues
  - Mobility, sensory perception
  - Tissue tolerance for pressure
  - Nutrition, moisture, shear/friction
  - Score 6-23

**Predictive Power of the Braden for Critically Ill Patients**

- Total Braden Score significant predictor of PU development
- May over predict (low specificity & PPV)
- Friction sub scale a significant predictor of PU* (Cox, J, Am J Crit Care, 2011;20(5):364-374)

**Its About the Sub-Scale’s**

- Retrospective cohort analysis of 12,566 adults patients in progressive & ICU settings for yr. 2007
- Identifying patients with HAPU Stage 2-4
- Data extracted: Demographic, Braden score, Braden subscales on admission, LOS, ICU LOS, presence of Acute respiratory and renal failure
- Calculated time to event, # of HAPU's
- Results:
  - 3.3% developed a HAPU
  - Total Braden score predictive (C=.71)
  - Subscales predictive (C=.83)

**Skin Failure Critically Ill Patient**

- 18 month prospective descriptive study to describe ICU patients with skin failure and determine relationships to other factors
- 29 patients
  - 100% had 1 or more other organ failures
  - 90% albumin level <3.5 mg/dL
  - time from adm to skin failure 7.7 days
  - Other factors in 75% of patients:
    - Generalized edema, Ventilator use, > 50 yrs old, Weight > 150lbs, Creatinine >1.5 mg/dL, MAP <70mmHg, Use of sedatives/analgesics
    - Correlations of paired variables
      - Sepsis & renal failure
      - Concurrent use of vasoactives

EBP Recommendations to Achieve Offloading & Reduce Pressure

• Turn & reposition every 2 hours (avoid positioning patients on a pressure ulcer)
• Heal-protection devices should elevate the heel completely (off-load) in such a way as to distribute weight along the calf
• Uses pillows to offload if expected immobility < 8 hrs
• Uses device is expected to be immobile > 8 hrs
• Use active support surfaces for patients at higher risk of development where frequent manual turning may be difficult
• Part of a mobility program


Successful Prevention of Heel Ulcers and Plantar Contracture in the High Risk Ventilated Patients

53 sedated patients over a 7 month period

Study Inclusion Criteria
• Sedated patient > 5 days
• May or may not be intubated
• Braden equal to or less than 16

Procedure
• Skin assessment and Braden completed on admission
• All pts who met criteria were measured for ROM of the ankle with goniometer, then every other day until pt did not meet criteria
• Heel appearance, Braden and Ramsey scores were assessed every other day and documented
• Identified and trained ICU nurses completed the assessments


In-Bed Mobility
EBP Recommendations to Achieve Offloading & Reduce Pressure

- Turn & reposition every 2 hours (avoid positioning patients on a pressure ulcer)
- Repositioning should be undertaken to reduce the duration & magnitude of pressure over vulnerable areas
- Cushioning devices to maintain alignment /30 ° side-lying & prevent pressure on boney prominences
- Use lifting device or other aids to reposition & make it easy to achieve the turn
- Assess whether actual offloading has occurred


RCT comparing 30 ° & 90° Turn For Prevention of PU

- Multicenter, open label, prospective, cluster-randomized trail comparing positioning regimes in older persons (LTC) at night for prevention of PU
- 12 sites:
  - 99 experimental: (3hr repositioning) 30 ° at night
  - 114 control: (6hr repositioning) 90 ° at night
- Results:
  - 30 ° q 3hrs vs. 90 ° q 6hr ↓ incidence of PU 3% vs. 11% p=0.035
  - All grade 1 or 2

The Routine

- Barriers:
  - Time to turn: 3.5-5min up to 17minutes
  - People resources
  - Current equipment not user friendly
- Staff perceived barriers
  - 41/49 in-bed activities
  - Unstable VS (59%) & low respiratory and energy reserves (46%) most common reasons for restricting activity
  - 34% stated safety issues/falling or tube/catheter integrity
  - 27% reported sedation

Draw Sheet/Pillows/People
Bates-Jensen et al 2003
Xakellis, et al 1995
Gefen et al 2008
Winkelman C, 2010,

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Current Practice:
Turn & Reposition
Transfer Device
Specialty Bed
Disposable Slide Sheets

EBP Recommendations to Achieve Offloading & Reduce Pressure

- Turn & reposition every 2 hours (avoid positioning patients on a pressure ulcer)
- Use active support surfaces for patients at higher risk of development where frequent manual turning may be difficult
- Early Mobility programs

Support Surfaces In Critically Ill Patients

- Comparison cohort study of 2 different support surfaces in critically ill patients
- 52 critically ill patients with anticipated 3 day LOS in a 12 bed cardiovascular unit in a University Hospital in the Mid-west were included until d/c from ICU
- 31 patients: low air-loss weight-based pressure redistribution-microclimate management bed
- 21 patients: integrated powered air redistribution bed
- Measured: positioning, skin assessment, heel elevation
- Results:
  - Mean LOS 7 days (on the surface equal amount of days)
  - LAL-MCM bed = zero pressure ulcers
  - IP-AR bed = 4/21 or 18% (p=0.046)

EBP Recommendations to Reduce Shear & Friction

- Use lifting/transfer devices & other aids to reduce shear & friction.
  - Mechanical lifts
  - Transfer sheets
  - 2-4 person lifts
  - Turn & assist features on beds
- Loose covers & increased immersion in the support medium increase contact area

Silicone Dressing to Reduce Shear & Friction

- 303 bed hospital, level 2 trauma center, ICU unit
- 273 patients participated with a mean age of 65
- Baseline HAPU determine from previous 35 months
- Measures: the effect on HAPU with the application of a silicone-bordered foam dressing
- Prospectively evaluated for 6 months and sacral area examined x2 daily
- Educational intervention
- Results:
  - Pre-HAPU was 13.6%
  - Post-HAPU was 1.8%

Care Giver Injury

- 50% of nurses required to do repositioning suffered back pain
- High physical demand tasks
  - 31.3% up in bed or side to side
  - 37.7% transfers in bed
- 40% of critical care unit caregivers performed repositioning tasks more than six times per shift
- Number one injury causation activity: Repositioning patients in bed

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Number, Incidence Rate, & Median Days Away From Work for Occupational Injuries RN’s with Musculoskeletal Disorders in US, 2003 – 2011

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<th>Year</th>
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<th>Occupation</th>
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<th>Incidence Rate</th>
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<td>9,060</td>
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</table>


National Problem of Ergonomic Injury in Healthcare Services

**COST FACTORS**

- One low back injury: $40,000
- Indirect costs outweigh direct costs 5:1
- $20 billion per year is spent annually on workers compensation costs associated with musculoskeletal disorders (MSDs)
- $100 billion per year is spent on indirect costs
- Injured nurses constitute about 1/4 of all claims and 1/3 of total compensation costs.

Source: US Department of Labor, Occupational Safety and Health Administration

Achieving the Use of the Evidence For Mobility & Moisture

Factors Impacting the ability to Achieve Quality Nursing Outcomes at the Point of Care

- Resource & System
  - Breathable glide sheet/stays
  - Foam Wedges
  - Microclimate control
  - Reduce layers of linen
  - Wick away moisture body pad

Value

Attitude & Accountability

Vollman KM. Australian Crit Care, 2009;22(4): 152-154

Comparative Study of Two Methods of Turning & Positioning

- Blocked design with convenience sample of 60 patients
- SOC: pillows/draw sheet
- TAP: breathable glide sheet/foam wedges/wick away pad

Results:
- Nurse satisfaction 87% versus 34%
- 30° turn achieved versus 0-15 in SOC
- SOC group required more resources


Impacting Outcomes: Decreasing Patient & Staff Injury

- 3 Select Medical System Hospital
- Intervention period over the course of a year
- Patients with anticipated > 5 days LOS, Braden subscales of moisture <1 and mobility <2 received the intervention
- Intervention: Turn & Position system
- Measured:
  - HAPU rates before & after
  - Staff injury before & after

Presented at AONHS 2012 National Clinical Conference, Dallas, TX. May 14-16, 2012
In-Bed Technology

Use of a slide/glide sheet and gravity assisted positioning reduced the workload for repositioning by 67% (Fragala, G. AAOHN, 2011;59(2):1-6)

Out of Bed Technology

Current Seating Positioning Challenges

- Uncomfortable
- Airway & Epiglottis compressed
- Lack of Body Alignment
- Shear/Friction
- Sacral Pressure
- Frequent repositioning & potential caregiver injury
- Potential fall risk

Repositioning Patients in Chairs: An Improved Method (SPS)

- Study the exertion required for 3 methods of repositioning patients in chairs
- 31 care giver volunteers
- Each one trial of all 3 reposition methods
- Reported perceived exertion using the Borg tool, a validated scale.

Method 1: 2 care givers using old method of repositioning
246% greater exertion than SPS

Method 2: 2 caregivers with SPS

Method 3: 1 caregiver with SPS
52% greater exertion than method 2


Evidence Based Strategies to Address Moisture

EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

- Clean the skin as soon as it becomes soiled.
- Use an incontinence pad and/or briefs that wick away
- Use a protective cream or ointment
- Disposable barrier cloth recommend by IHI & IAD consensus group
- Pouching device or a bowel management system
- Ensure an appropriate microclimate & breathability
- < 4 layers of linen
- Barrier & wick away material under adipose and breast tissue


www.ihi.org
Current Practice: Moisture Management

- Disposable Incontinence Pads
- Airflow pads for Specialty Beds
- Reusable Incontinence pads
- Adult diaper

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Evaluating the Efficacy of a Uniquely Delivered Skin Protectant and Its Effect on the Formation of Sacral/Buttock Pressure Ulcers

**Methodology:**

- Retrospective/prospective quasi-experimental study
- 57 bed LTC
- Data collected 3 months before use & 3 months following conversion
- Demographics comparable between groups
  - Age, LOS, mobility in bed, transfer between surfaces, incontinence of bowel/bladder, BMI, albumin and concurrent disease scale
- Pre-data revealed 12 residents with incontinence developed 15 sacral stage 1 & 2 ulcers.
- Monthly incidence rates over 9 months 4.7%

Clever et al. “Pressure Ulcer” Study

Evaluating the Efficacy of a Uniquely Delivered Skin Protectant and Its Effect on the Formation of Sacral/Buttock Pressure Ulcers

Average Monthly Incidence of Sacral/Buttock Pressure Ulcers

<table>
<thead>
<tr>
<th>Old Standard of Care</th>
<th>New Standard of Care</th>
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<tbody>
<tr>
<td>July 2000 to March 2001</td>
<td>May to July 2001</td>
</tr>
<tr>
<td>Feb to April 2002</td>
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89% Reduction in Incidence

*No significant differences in impact variables between groups

Reducing IAD in the Critical Care Area

**Methodology:**

- Adult patients admitted to the ICU without skin breakdown were included
- Sample size of 100 for each of the 2 study arms
- Measured how often appropriate prevention measures for IAD are used
- Measured rate of skin breakdown in patients with fecal incontinence who were managed with intervention protocol
- 1st phase examine current practice: skin cleanser and separate barrier and frequency of use
- 2nd phase introduced an all in one incontinence management system

Reducing IAD in the Critical Care Area

**Results:**

- Collected data on 131 patients
  - 50% (8/16 incontinent) patients developed perineal dermatitis (skin breakdown)
  - Non-compliance with incontinence skin care protocol
  - Reasons for non-compliance
    - Not easy to apply/not easy to remove
  - Collected data on 177 patients post incontinence product change
    - 19% (3/16 incontinent) patients developed perineal dermatitis (skin breakdown)
EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

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Fecal Containment Device

- Provides a method for managing fecal incontinence.
- Remains securely attached to ambulatory patients
- Kit contains collection bag, closure clip, drainage bag adapter, powder adhesive and adhesive remover.

Evaluation of a New, Novel Male External Urinary Management Device

- 31 RN’s/3 units
- 42 devices
- Mean wear time > 23hrs
- Easy to apply
- 72.8% of RN’s likely to advocate for its use
  - No UTI’s reported in patients using the new male external catheter

What Lies Beneath the Patient

- Linen
  - Linen increases entrapment of moisture
  - Creates wrinkles
  - May increase risk of skin compromise
  - Limit linens on all beds
    - Especially on pressure redistribution beds and low air loss beds
  - Newer ICU beds are pressure redistribution surfaces
  - www.npuap.org

Body Position: Clinical Practice vs. Standard

- Methodology
  - 74 patients/566 total hours of observation
  - 3 tertiary hospitals
  - Change in body position recorded every 15 minutes
  - Average observation time 7.7 hours
  - Online MD survey
- Results
  - 49.3% of observed time no body position change
  - 2.7% had a q 2 hour body position change
  - 80-90% believed q 2 hour position change should occur but only 57% believed it happened in their ICU

Overcoming Barriers to Immobility

- 74 patients/566 total hours of observation
- 3 tertiary hospitals
- Change in body position recorded every 15 minutes
- Average observation time 7.7 hours
- Online MD survey
- Results
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References:
Positioning Prevalence: UK ICU’s

• Methodology
  - Prospectively recorded, 2 days, 40 ICU’s in the UK
  - Analysis on 393 sets of observations
  - Turn defined as supine position to a right or left side lying
• Results:
  - 5 patients prone at any time, 3.8% (day 1) & 5% (day 2) rotating beds
  - Patients on back 46% of observation
  - Left 28.4%
  - Right 25%
  - Head up 97.4%
  - Average time between turns 4.85 hrs (3.3 SD)
  - No significant association between time and age, wt, ht, resp dx, intubation, sedation score, day of wk, nurse/patient ratio, hospital

Hemodynamic Instability

Is it a Barrier to Positioning?

Hemodynamic Status

• No differences noted in hemodynamic variables between supine & positions
• Lateral turn results in a 3-9% decrease in SVO2 which takes 5-10 minutes to return to baseline
• Appears the act of turning has the greatest impact on any instability seen
• Minimize factors which contribute to imbalances in oxygen supply & demand

Patients at Risk for Intolerance to Positioning

• Elderly
• Diabetes with neuropathy
• Prolonged bedrest
• Low Hb an cardiovascular reserve
• Prolonged gravitational equilibrium

Decision Making Tree for Patients Who Are Hemodynamically Unstable with Movement

Any Work on Skin Should Be Incorporated into a Progressive Mobility Protocol
Outcomes of A Progressive Mobility Program

- ↓ incidence of skin injury
- ↓ time on the ventilator
- ↓ incidence of VAP
- ↓ days of sedation
- ↓ delirium
- ↑ ambulatory distance
- Improved function

How Do We Make It Happen?

M2: Mobility and Moisture Protocol to Drive Care: Implementing Best Practices with Ease

- 1st step: Collection of baseline data
- 2nd step: Evaluating resources
- 3rd step: Education on products and processes
- 4th step: Sustaining change in practice
- 5th step: Evaluate outcomes

Implementing Best Practices with Ease

1st Step: Collection of baseline data
- Direct observation of current status on Q2hr turning
- Nosocomial pressure ulcer rates (NDNQI)
- Incontinence associated dermatitis rates (IAD Form)
- Staff musculoskeletal injuries (Employee Health)
- Cost-analysis of patient and staff injuries

The things included in the measurement becomes relevant, the things omitted are out of sight out of mind

Peter F. Drucker
Implementing Best Practices with Ease

2nd Step: Evaluating resources to help staff achieve the right care, at the right time with the right pt
- Slide/Glide sheet that remains underneath the patient to reduce shear/friction & aid with turning
- Foam wedges to help sustain the turn
- Lifts and chair devices for out of bed mobility
- Best surface underneath the patient based on risk
- Large enough wick away pad to remove moisture
- Every thing breathes & appropriate layers of linen
- Tools inside the patients room (turn clock, musical cues)
- A protocol


Implementing Best Practices with Ease

3rd Step: Education on products and processes
- Education on the evidence based strategies
- Education on any new products and how they will be used
- Re-education when necessary to ensure appropriate use
- Use of reference cards
- Build into orientation

Implementing Best Practices with Ease

4th Step: Sustaining change in practice
- Skin rounds/time frequency
- Hand-off communication
- Skin liaison/champion nurses
- Creative strategies to reinforce protocol use
  - Visual cues in the room or medical record
  - Rewards for increase compliance
- Yearly competencies on beds or positioning aids to ensure correct and maximum utilization

Implementing Best Practices with Ease

5th Step: Evaluate outcomes using comparison of data measurements pre and post implementation
- Direct observation measurement of turning
- Nosocomial pressure ulcer rates (NDNQI)
- Incontinence associated dermatitis rates (IAD Form)
- Staff musculoskeletal injuries (Employee Health)
- Cost-savings analysis of patient and staff injuries post change in practice (including any new product costs)

Can We Make a Difference?

- 78 hospitals in California
  - Submitted data to CALNOC
  - All inpatient units, plus observational
- Time period: 2003-2010
- Reported on 258,456 adult patients, 1970 prevalence studies, no △ in hospital days over time
- Standardized tool used with interrater reliability ensured
- Common interventions used:
  - Protocol development with evidence based practices
  - Staff education
  - Risk assessment tool
  - Monitoring & feedback


Can We Make a Difference?

- HAPU all stages ↓ from 10.4% to 1.8%*
- HAPU 2+ ↓ from 5.9% to 1.2%* (> in Medical vs. Surgical)
- HAPU 3+ ↓ from 2.0% to 0.4%*

Notes on Hospitals: 1859

“It may seem a strange principle to enunciate as the very first requirement in a Hospital that it should do the sick no harm.”

Florence Nightingale

Advocacy = Safety
For Our Patients & Ourselves

Be Courageous

We all are responsible for the safety of our patients & ourselves…Own the Issues

• “If not this, then what??”
• “If not now, then when?”
• “If not me, then who??”