Learning Objectives

- Describe the pathogenesis of pressure injury (PI) formation
- Recognize the implications of pressure injuries on patient quality of life and health
- Examine recent guidelines for the NPUAP and AHRQ on the use of foam dressings along with a comprehensive prevention/treatment protocol in the prevention and treatment of pressure injuries
- Develop comprehensive protocols for the prevention and treatment of pressure injuries and sustained outcomes at the point of service

Definition of Pressure Injury

Pressure Injury
- Localized damage to the skin and underlying soft tissue
- Usually over a bony prominence or related to a medical or other device
  - Injury can present as intact skin or an open ulcer
  - May be painful
- Injury occurs as result of intense and/or prolonged pressure or pressure in combination with shear
  - Tolerance of soft tissue for pressure and shear may also be affected by
    - Microclimate
    - Nutrition
    - Perfusion
    - Comorbid conditions
    - Condition of soft tissue

Pathogenesis of Pressure Injury

- "Bottom-up" theory: External pressure leads to necrosis that first develops in subcutaneous fat and/or muscle tissue and then appears later in the skin
- It is thought that external pressure and/or shear force and its counteractive force from bone prominences directly cause tissue ischemia and deformation, leading to deep tissue necrosis
- Reparation injury due to oxidative stress also adds to the damage
- Skin is more tolerant to ischemia than subcutaneous adipose and muscle tissue
  - Skin vascularity strongly depends on the underlying tissues
  - Severe damage to the deep tissue impacts skin viability
- Injury progression may be caused in part by loss of perfusion, oxidative stress, influx of calcium, efflux of alarmins, or other disruptions of the environment

Etiology of Pressure Injuries

Duration and Intensity of Pressure

Tissue Tolerance

Pressure Injury
Significance: Are Pressure Injuries a Concern?

- Prevalence
  - 2.2% to 24%: Skilled nursing facilities
  - 0.4% to 38%: Acute care
  - 0% to 17%: Home care

- Hospital length of stay doubles with a pressure injury
- Pressure injuries in elderly persons have also been associated with increased mortality rates
  - 70% in patients aged ≥70 years
  - 2 to 6 times' greater mortality risk

- Increases 6-fold with a pressure injury
- Increases 4-fold with a healed pressure injury


Significance: Are Pressure Injuries a Concern? (cont)

- Financial
  - CMS: In 2007, monetary penalties were attached to HAPI stage 3/4
  - Cost of HAPU-1 HAPU: Approximately $30,000 to $151,700
  - The estimated cost of treating pressure injuries: $11 billion a year

- Quality and outcome-based reimbursement
  - CMS
  - Joint Commission (JCAHO)
  - State departments of health

- Quality measure: Publically reported
  - Magnet: National Database of Nursing Quality Indicators (NDNQI®) benchmark
  - Magnet accreditation
  - High-reliability organizations
  - Transparency: Outcomes reportable to the public

CMS = Centers for Medicare & Medicaid Services; HAPI = hospital-acquired pressure injury; HAPU = hospital-acquired pressure ulcer.


The Dangers of Going to Bed

Look at the patient laying long in bed
What a pathetic picture he makes.
The blood clotting in his veins,
The lime draining from his bones,
The soylla stacking up in his colon,
The flesh rotting from his seat,
The urine leaking from his distended bladder,
And the spirit evaporating from his soul.


Pressure Injury Prevention: Essential Components

1. Conduct a pressure injury admission assessment
2. Assess risks daily (eg, Braden, Norton)
3. Inspect skin daily
4. Manage moisture
5. Maximize nutrition
6. Minimize pressure

- Education (staff, provider, patient, family)

Armstrong D, et al. *Opportunities to Improve Pressure Ulcer Prevention and Treatment: Implications of the CMS Acute Care Prevent on Admission (POA)/Hospital Acquired Conditions (HAC) Ruling: A processing paper from the International Board Wound Care*.

### Sustaining Improvements: Structure-Process-Outcomes

#### Four Magnet Model Domains
1. Transformational leadership
2. Structural empowerment
3. Exemplary professional practice
4. New knowledge: Innovation and improvement

- Successful implementation of these elements yields measurable positive outcomes

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### Transformational Leadership

Examples of PIP strategies incorporating transformational leadership

- Key leader stakeholder (vice president) appointed to facilitate/support PIP initiatives
- PIP clinical program facilitator appointed/designated
- Sets clear expectations for benchmarking, outcomes, and accountability
- Removes barriers

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### Structural Empowerment

Examples of PIP strategies incorporating the Magnet component of Structural Empowerment

- PIP team established: System, facility, unit level, multidisciplinary
  - Board level (safety and risk board) → Nurse Executive Council → PPS committee → WCIPP committee → Facility PPC → Facility PIP unit
- Time and resources for group meetings and projects are supported
- Supports use of full-time equivalent to do the work: System → facility → unit
- Communicates those expectations to all levels
- Supports interdisciplinary team development

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### Exemplary Professional Practice

Examples of PIP strategies incorporating Exemplary Professional Practice

- Evidence-based PIP protocol, plan of care, order sets developed and embedded into EMR
  - IT = information technology; WTA = wound treatment associate.

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### Pressure Ulcer Prevention

Do No Harm Through Elimination of HAPUs

- POA = present on admission; PPOC = prevention plan of care.

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**NPUAP = National Pressure Ulcer Advisory Panel; EMR = electronic medical record; HAPI = hospital-acquired pressure injury.**


**IT = information technology; WTA = wound treatment associate.**

New Knowledge: Innovation and Improvement

Examples of PIP strategies incorporating the Magnet component of New Knowledge

- Research activities
  - WOCU: Vision, and Continence Nurses Society grant support a # 1 RCT (Softsilicones transition into practice). RR
  - DVT: Vascular Health Grant, American Association of Critical-Care Nurses grant research (WOCU, November 2014)
  - Soft silicone dressing as prevention: Cost savings of $271,000 to $1,972,100
  - DVT, Vascular Health Grant, Indiana University Health quality award
- Supports evidence-based practice projects to improve PIP: WTA program evidence-based practice projects
  - PIP and pressure ulcer
  - PIP and progressive mobility
  - PIP and linen use
- Supports publication of clinical work: Journal articles, abstract submissions, poster presentations
- Recognizes innovation: Standing-agenda item (tests of change)
- Promotes PIP beyond organization into the community: WTA program evidence-based research activities

Think SKIN!

- S Surface selection
- K Keep turning (pressure redistribution)
- N Incontinence management
Growing Evidence for Prevention Dressings

- Quasi-experimental, convenience sample of 95 critical-care patients to compare pressure injury development
- Participants were allocated randomly to 1 of 3 groups
  - Repositioning of routine management
  - Hydrocolloid dressing
  - Foam dressing
- Repositioning of routine management group had the highest incidence rate of pressure injuries followed by the hydrocolloid dressing group
- Foam-dressing group recorded no pressure injuries

Conclusions
- Patients in high-risk groups in clinical settings should adopt strategies
  - Repositioning
  - Regular skin evaluations
- Hydrocolloid or foam dressings may be used as appropriate to prevent sacral pressure ulcers

Evidence and NPUAP/AHRQ Guidelines for Prevention Dressings

- The use of dressings can reduce the amplitude of shear stress and friction reaching the skin of patients at risk
- Dressings can also effectively redirect these forces to wider areas, which minimizes the mechanical loads upon skeletal prominences
- Shear force is believed to affect pressure ulceration
- Dressing materials that reduce shear force may prevent ulceration and facilitate healing

Interventions

- Support surface: Know your bed!
- Turn, turn, turn – reposition – THERE ARE NO MAGIC BEDS!
- Prevention dressings: Foam
- Incontinence? Moisture barriers
- Consider a nutrition consultation if patient has poor nutrition risk score, and implement an appropriate nutrition care plan
- Provide adequate fluids
- Consider medical devices: Nasogastric tube, sequential compression device, endotracheal tube, tracheostomy, intravenous tubing, indwelling catheter (Foley catheter), braces, casts

Growing Evidence for Prevention Dressings: Summary

- Based on a systematic review: a single high-quality RCT; a growing number of cohort, weak RCTs; and case series, the introduction of a dressing to prevent pressure injuries may help reduce the incidence of pressure injuries associated with medical devices, especially in patients in the intensive care unit
- There is no firm clinical evidence at this time to suggest that one dressing type is more effective than other dressing types
- AHRQ clinical guidelines, including the use of prophylactic/prevention dressings
- NPUAP 2011 guidelines for the prevention of pressure injuries
- WOCN 2014: Prevention and management of pressure injuries
- U.S. Preventive Services Task Force: Evidence-based clinical practice guideline
- National Pressure Ulcer Advisory Panel
- Pan Pacific Pressure Injury Alliance
- National Pressure Injury Advisory Panel
- Pressure-injury prevention consultation


Pan Pacific Pressure Injury Alliance.


Prevention Dressings: Summary

When selecting a prevention dressing, consider:

- Ability of the dressing to manage moisture and microclimate
- Ease of application and removal of dressing
- Ability to remove the dressing to reassess skin
- Thickness of the dressing under medical devices

Pressure Injury: Treatment

Components of pressure injury treatment include:

- Accurate diagnosis and classification
- Assessment and monitoring of healing
- Pain assessment and treatment
- Wound bed preparation
- Assessment and treatment of infection and biofilm
- Use of biophysical agents
- Surgery

Pressure Injury: Treatment (cont)

Accurate diagnosis and classification

- Determine if wound is pressure related
  - Differentiate pressure-related injuries from other types of wounds
  - Moisture-associated skin damage most commonly confused with pressure injuries
- Recommend using NPUAP pressure injury classification
- Each stage clarified based on recent research and expert clinical consensus
  - Improving the accuracy of pressure injury staging
  - Clarifying deep tissue pressure injuries
- New system will allow healthcare providers to identify and treat pressure injuries earlier and more accurately
- Classify (stage) pressure injuries caused by medical devices
- Do not stage pressure injuries on mucous membranes

Pressure Injury: Treatment (cont)

Assessment and monitoring of healing

- Complete a comprehensive initial assessment
- Reassess individual, pressure injury, and plan of care if injury does not show healing as expected
- Assessment of pressure injury should be at least weekly
- Darkly pigmented skin assessment should include
  - Skin heat
  - Skin tenderness
  - Change in tissue consistency
  - Change in pain

Pressure Injury: Treatment (cont)

NPUAP in Collaboration with CMS: 2016 Pressure Injury Staging System

- Collaborative discussion between CMS and NPUAP included the NPUAP’s 2016 staging system
- Each stage clarified based on recent research and expert clinical consensus
  - Improving the accuracy of pressure injury staging
  - Clarifying deep tissue pressure injuries
- New update will allow healthcare providers to identify and treat pressure injuries earlier and more accurately
- 2016 updated staging system includes
  - Stage 1: Non-blanchable erythema of intact skin
  - Stage 2: Partial-thickness skin loss with exposed dermis
  - Stage 3: Full-thickness skin loss
  - Stage 4: Full-thickness skin and tissue loss
  - Unstageable: Obscured full-thickness skin and tissue loss
  - Deep tissue: Persistent non-blanchable deep red, maroon, or purple discoloration

Pressure Injury: Treatment (cont)

Pain assessment and treatment

- Complete a pain assessment on adults and children using a valid/reliable scale
- Incorporate equipment, positioning, and postures to minimize pain
- Select wound dressings to minimize pain
  - Foam dressings with silicone borders to minimize medical adhesive related skin injury (MARSI)
- Consider non-pharmacologic and pharmacologic strategies
- Reduce procedural pain
  - Topical
  - Systemic
- Manage chronic pain
- Educate individuals and families in strategies
Focus on Foam Dressings

International pressure injury guidelines recommend considering foam dressings for use on exudative stage 2 and shallow stage 3 pressure injuries:

- Avoid using single small pieces of foam in excuding cavity ulcers
- Consider using gelling foam in highly exuding pressure injuries
- Used on full-thickness wounds (eg, stage 2 or 3 ulcers) with moderate to heavy exudate
- Dressing change up to 3 times per week
- Foam wound fillers up to once per day
- Can be used as secondary dressings to absorb exudate from primary dressings (alginate, collagen, fiber/polymer/biofiber) to enhance absorption of wound exudate

References


8. Cadexomer iodine
- Odorless, stable, and non-toxic
- Can be used as secondary dressings
- Indicated for use on exudative stage 2 and shallow stage 3 pressure injuries

9. Hydrocolloid
- Transparents film
- Alginates
- Foam
- Silver-impregnated
- Honey-impregnated
- Cadexomer iodine

10. Types of Prevention/Treatment dressings

Gauze
- Silicone
- Collagen matrix
- Composite
- Biologic
- Growth factors (platelet-derived growth factors)
- Prophylactic
- Negative-pressure wound therapy


