Medical Device Related Pressure Injuries

Joyce Pittman, PhD, RN, ANP-BC, FNP-BC, CWOCN
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Faculty Disclosure

- Joyce Pittman, PhD, RN, ANP-BC, FNP-BC, CWOCN

The webinar faculty has listed no financial interest/arrangements that would be considered a conflict of interest.
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The planning committee members have listed no financial interest/arrangements that would be considered a conflict of interest.

Objectives

The participant will:

1. Define medical device-related pressure injuries.

2. Describe current evidence related to medical device-related pressure injury prevention.
Medical Device Related Pressure Injuries

“Medical device related pressure injuries result from the use of devices designed and applied for diagnostic or therapeutic purposes. The resultant pressure injury generally conforms to the pattern or shape of the device. The injury should be staged using the staging system.”

(NPUAP, 2016)

Medical Device Related Pressure Injuries

- A device-related pressure injury is defined as 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, and mirrors the shape of the device.

Pittman, et al., 2015. JWOCN
Medical Device Related Pressure Injury

• “Medical Device Related Pressure Injury”
  IS NOT:
  – A stage

• “Medical Device Related Pressure Injury”
  IS:
  – A classification

(NPUAP, 2016)

Mucosal Membrane Pressure Injury

“Mucosal membrane pressure injury is found on mucous membranes with a history of a medical device in use at the location of the injury. Due to the anatomy of the tissue these ulcers cannot be staged.”

(NPUAP, 2016)
NPUAP MDRPI Task Force

- NPUAP Research Committee created a task force to examine current evidence related to medical device-related pressure injury (MDRPI) prevention

- The task force self-divided into two-Adults & Pediatric- due to special needs & characteristics of HAPI in the pediatric population

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NPUAP MDRPI- Adults

MDRPI Task Force- Adults:
Joyce Pittman
Janet Cuddigan
Carol Gillespie
Laurie McNichol

Purpose/Goal of MDRPI Task Force- Adults:
- Identify MDRPI prevention best practices through review of current evidence using a structured & systematic approach.

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NPUAP MDRPI- Adults

**PICO question**- Do MDRPI prevention strategies result in a decrease of MDRPI in adults who are at risk for development of MDRPI?

- **P = Adults @risk for MDRPI**
- **I = MDR prevention strategies**
- **C = No prevention**
- **O = MDRPI**

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MDRPI in Adults: Search Strategy

- International Pressure Ulcer Guideline 2014 search methodology was used as a guide
- Johns Hopkins evidence rating and quality methodology was used for appraisal of evidence
- A search of the literature was conducted by a trained medical librarian.

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MDRPI in Adults: Search Strategy

- Inclusion criteria included: human subjects 18 years of age and older, literature representing pressure injury (pressure ulcer) prevention focus, articles written in English, & publications written between 2000-2017

- Search terms included pressure injury, pressure ulcer, decubitus, bed sore, prevention, prophylactic, medical device, prevention dressings.

Using the International PU Guideline MDRPI reference list as a baseline & the new reference list compiled by the medical librarian, 1039 articles were identified.

- 886 were discarded as not meeting inclusion criteria, leaving 161 articles (JC)

- An additional 147 articles were discarded after an in-depth review of abstract & article text leaving 13 studies for this report (JP)

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MDRPI Prevalence & Incidence

MDRPI in Adults: EVIDENCE

**MDRPI Incidence**
- 10% (VanGilder et al., 2009)
- 60.7% (Ham, 2016)
- 34.5% (Black et al., 2010)
- 33%- 48% (Pittman et al., 2015; Pittman, 2017)

**Common devices:** (Arnold-Long, 2017)
- Respiratory devices (10-71%)
- Splints/braces (7-36%)
- Tubes/drains (5-17%)
### MDRPI in Adults: EVIDENCE

<table>
<thead>
<tr>
<th>Category</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nasal/face</strong></td>
<td>- 4-23% (Ambutas, 2014)</td>
</tr>
<tr>
<td></td>
<td>- 17%, 19.9% ear (Vangilder et al., 2012)</td>
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<tr>
<td></td>
<td>- 13% O2, 8% NG (Apold, 2012)</td>
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<tr>
<td></td>
<td>- 10-71% O2 tubing/CPAP/BiPAP (Arnold-Long et al., 2017)</td>
</tr>
<tr>
<td><strong>Cervical Collar</strong></td>
<td>- 6.8-22% (Apold, 2012)</td>
</tr>
<tr>
<td><strong>Tracheostomy</strong></td>
<td>- 8.1%- 11.8% (Davies, 2016)</td>
</tr>
<tr>
<td></td>
<td>- 1.9-12.5% (O'Toole et al., 2016)</td>
</tr>
<tr>
<td><strong>Splints/Braces</strong></td>
<td>- 17-36% (Arnold-Long, 2017)</td>
</tr>
<tr>
<td></td>
<td>- 3.6-42.9% (Forni, et al., 2011)</td>
</tr>
<tr>
<td></td>
<td>- 17% immobilizers; 12% stockings/boots (Apold, 2012)</td>
</tr>
<tr>
<td><strong>Tubes/drains</strong></td>
<td>- 5-17% (Arnold-Long, 2017)</td>
</tr>
<tr>
<td></td>
<td>- 24.1-67.3% urinary meatus (Rassin et al., 2013)</td>
</tr>
<tr>
<td></td>
<td>- 8% NG (Apold et al., 2012)</td>
</tr>
</tbody>
</table>
MDRPI in Children: Evidence

• #1 PI cause in younger pediatric populations (Baharestani & Ratliff, 2007; Schlüer et al., 2014)

• Neonates - more intensive care therefore more external devices (Schluer et al., 2014)

• Common devices: respiratory, pulse ox, IVs, tubing, EKG leads

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MDRPI in Children: Evidence

• Schluer & colleagues 2014: 54/204 patients had 91 HAPIs—38.5% PIs from external devices (prevalence)

• Visscher & colleagues 2013: PICU - Pre/Post intervention reduced rate post but 69% PIs from medical devices (incidence – count/patient-days)

• Miske & colleagues 2017: 71% PIs from medical devices – *respiratory* (incidence – count/patient-days)

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Nearly 80% of PIs associated with devices

Over 90% of device-related PIs were in premature infants

- Prevalence: 1.14% - 8.2% (Al-Ashhab et al., 2013; Razmus & Bergquist-Beringer, 2017)

- ICUs: 14% to 43.1% (Al-Ashhab et al., 2013; Razmus & Bergquist-Beringer, 2017)

- Frank & colleagues (2017) - ↓0.06 to 0.03/1,000 patient days after using a prevention bundle
MDRPI Prevention Strategies

MDRPI in Adults: EVIDENCE

- **Removal of device** (Level II, III, V- Quality A/B)
  - Early removal < 24 hours (Ham, 2014; Apold, 2012)
  - Removal of trach sutures (O’Toole, 2016)

- **Pressure redistribution**
  - Prophylactic dressing- (Level II, III, IV. V- Quality A/B/C)
    - (Black, 2013; Clark, 2014; Davies, 2016; Apold, 2012; Forni, 2011; Huang, 2009; O’Toole, 2016; Weng, 2008)
- Foam, Hydrocolloid, Transparent, gauze
MDRPI in Adults: EVIDENCE

- **Pressure redistribution** (Continued)
  - Foam ring (Level V- Quality B) (Ham, 2014)
  - Repositioning (Level I, III, IV- Quality B/C) (Apold, 2012; Black, 2013; Rassin, 2013)
  - Securement alternatives (Level I, II, V-Quality B/C) (Ambutas, 2014; Rassin, 2013; Zaratkievicz, 2012)
  - Positioning of head (Level II- Quality A) (O’Toole, 2016)

MDRPI in Adults: EVIDENCE

- **Prevention Bundles**
  - Tracheostomy (O’Toole, 2016)
    - Prophylactic dressing- (HCD) immediate post-op
    - Suture removal after 7 days
    - Prophylactic dressing- (foam)
    - Neutral positioning of head
  - General (Black, 2013)
    - Prophylactic dressing (foam)
    - Continue to lift or reposition device
    - Do not add more padding if device is tight
MDPRI in Adults: EVIDENCE

• Prevention Bundles
  – Respiratory Devices (Apold, 2012)
  – Cervical Collars (Apold, 2012; Ham, 2014)

• Recommendations (using SORT):
  1. Remove device as soon as medically possible
  2. Use of Prophylactic dressings
  3. Repositioning of device
  4. Multi-modal approach (bundle)

MDPRI Prevention Evidence

Inspect skin under & around device at least twice daily
(Strength of evidence = C)

Conduct more frequent assessments if patient is vulnerable to fluid shifts or exhibiting signs of edema
(Strength of evidence = C)
MDPRI Prevention Evidence

- Prevention bundles
  - “a small set of evidence-based interventions for a defined patient population and care setting” (Resar et al., 2012)
  
  - Combination of prevention elements
    - Can be tailored to population or unit/area
    - Can be used as audit tools

Best Practices for Prevention of Medical Device-Related Pressure Ulcers in Critical Care

- Choose the correct size of medical device(s) to fit the individual.
- Cushion and protect the skin with dressings in high-risk areas (e.g., nasal bridge).
- Inspect the skin to examine with device(s) at least daily (if not, medically contraindicated).
- Avoid placement of device(s) over sites of prior or existing pressure ulcer.
- Educate staff on correct use of devices and prevention of skin breakdown.
- Be aware of edema under device(s) and potential for skin breakdown.
- Confirm that devices are not placed directly under an individual who is bedridden or immobile.
Best Practices for Prevention of Medical Device-Related Pressure Ulcers in Long Term Care

- Choose the correct size of medical device(s) to fit the individual
- Cushion and protect the skin with dressings in high-risk areas (e.g., nasal bridge)
- Inspect the skin in contact with device at least daily (if not medically contraindicated)
- Avoid placement of device(s) over sites of prior or existing pressure ulcer
- Educate staff on correct use of devices and prevention of skin breakdown
- Be aware of edema under device(s) and potential for skin breakdown
- Confirm that devices are not placed directly under an individual who is bedridden or immobile

Best Practices for Prevention of Medical Device-Related Pressure Injuries in Pediatric Populations

- Choose the correct size of medical device(s)
- Cushion and protect the skin with dressings in high-risk areas (e.g., nasal bridge)
- Inspect the skin in contact with device at least daily (if not medically contraindicated)
- Avoid placement of device(s) over sites of prior or existing pressure injury
- Educate staff on correct use of devices and prevention of skin breakdown
- Be aware of edema under device(s) and potential for skin breakdown
- Confirm that devices are not placed directly under an individual
Implications for Practice: Challenges & Opportunities

Other devices that can cause injury:

- **Personal items**
  - Cell Phones
  - Pens/pencils
  - Toothbrush
  - Comb/brushes
- **Bathing items**
  - Bedpans
  - Basins
- **Care items**
  - Needle caps
  - Syringes
- **OR items**
  - Positioners
  - Pads
  - Call light
  - Electrical cords
  - Razors
  - Cutlery
  - Glasses
  - Hearing aids
Is the patient at high risk for skin injury from respiratory medical device?

Risk factors: Braden <18, Age >75 & < 100, Craniofacial abnormalities; mucosal edema; O2 Sat level fragile, hemodynamically unstable, facial edema, rigid medical device (i.e. ETCO2 cannula, non-heated high flow O2 tubing). 

No

Continue present prevention plan.

YES

Determine surveillance: Action: Unit level resources; EUSN Skin Champion; Implement BiPap- Consider alternative device.

NG/Corpak Taping Method to Relieve Pressure to the Nare

1. Supplies: - Scissors - Tongue depressor
2. Cut a piece of tape the length of the tongue depressor. (This is just like the tape we use to manipulate the finished piece does have to be this long.)
3. Fold the tape in the middle (between where you cut the slit) to form an “T” shape.
4. The stem part of the “T” needs to be about 1 inch long to allow the tube to float free in the naso.
5. Cut 2 slits on both sides of the tape, as shown in the picture. (more than 1 inches apart)
6. Continue from draping. Continue to off-load pressure

NG more than 1 inches apart

Continue surveillance and monitoring

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Polling Question

1. Does your facility include medical device related pressure injuries in their prevalence surveys?

a. Yes

b. No

Do you know your DATA?

What are your trends?
POLLING Question

2. What devices are problematic in your facility?
   a. Respiratory devices- ETT, O2, Bipap
   b. NG
   c. Splints/braces
   d. Tubes/drains
   e. Do not know

Challenges & Opportunities

- EMR terminology not standardized
- Wide variation in practices- surgeons vs. nursing
- Multidisciplinary collaboration- RT, PT, RN
- Medical device vs commonly used items (cell phone, pen, etc). Who controls the item?
- Accurately determining etiology when device no longer in use
Benchmarking Challenges & Opportunities

• Standardized definitions
  – Medical vs. equipment
  – State vs. state
• Documentation into EMR
  – Cerner vs. Epic
  – Prevention interventions
  – EMR format- free text or integrated
• Standardized Terminology

Summary

• Acknowledge the challenges & look for the opportunities
  – Count MDPRIs in the “numbers”
  – Prevention bundles
  – Audits – look for patterns
  – RCA/ACA – look for patterns
  – An interprofessional process
  – Educate
Objectives Re-visited

The participant has:
• Defined medical device-related pressure injuries.

• Describe current evidence related to medical device-related pressure injury prevention.

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Questions?

References

References

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