Saving Face Strategies to reduce skin breakdown during noninvasive ventilation (NIV) for patient care







Objectives

- Define the key factors that can lead to mask-related NIV complications
- Define ways to manage and reduce the potential of skin breakdown during NIV
- Provide ways to improve patient care by reducing the potential of skin breakdown
- Discuss best practices for initial patient assessment and documentation
- Offer strategies for providing better patient comfort

NIV is the standard of care

"It is no exaggeration to say that NIV has revolutionized the treatment of acute respiratory failure."¹



¹ Scott K. Epstein, MD. Respiratory Care, January 2009 Vol 54 No 1.

Centers for Medicare & Medicaid Services

CMS classified Stage III and IV pressure ulcers as a preventable Hospital Acquired Condition (HAC)²

These are no longer reimbursed by current insurance guidelines¹



¹ Epstein, Scott K., M.D. Noninvasive ventilation to shorten the duration of mechanical ventilation; Respiratory Care, January, 2009, Vol. 54 No. 1 ² Gregoretti. C., Confalonieri, M., Navalesi, P., Squadrone, V., Frigerio, V., Frigerio, P., Beltrame, F., Carbone, G., Conti, G., Gamna, F., Nava, S., Calderini, E., Skrobik, Y., Antonelli, M.Evaluation of patient skin breakdown and comfort with a new face mask for non-invasive ventilation: a multi-center study. Intensive Care Medicine 2002; 28:278-284

How are pressure injuries impacting your facility?

- Difficult to manage
- Costly
- A cause for litigation

Requires a multidisciplinary approach, from Administration to the bedside clinician.



What is a pressure injury?

A 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.



Incidence of skin breakdown

- Skin breakdown "... even after only a few hours of ventilation, is a frequent complication, ranging from 2-23%"¹
- "In one study, where patients were continuously ventilated with a face mask for more than 48 hours, this percentage reached 70%"²



•¹ Epstein, Scott K., M.D. Noninvasive ventilation to shorten the duration of mechanical ventilation; Respiratory Care, January, 2009, Vol. 54 No. 1 ² Armour-Burton, T., Field, W., Outlaw, L., Deleon, E.. The Healthy Skin Project: Changing Nursing Practice to Prevent and Treat. Critical Care Nurse, Vol 33, No. 3, June 2013

Incidence of skin breakdown

- Localized areas of tissue necrosis
- Develop when soft tissue is compressed between a bony prominence surface for an extended period of time





Most common on bridge of nose¹

Extreme cases involve surrounding areas, like over the nose but also on the chin

¹ Epstein, Scott K., M.D. Noninvasive ventilation to shorten the duration of mechanical ventilation; Respiratory Care, January, 2009, Vol. 54 No. 1

What causes a pressure injury?

The primary causes are³:

- Shearing forces:
 - Cause stretching, kinking, and tearing in the subcutaneous tissues
 - Lead to deeper tissue necrosis
- Excessive compressive pressure (CP)
 - CP should be < diastolic BP</p>
 - CP should be < capillary BP (32-45 mmHg)

Risk increases with³:

- Duration of pressure exposure
- Pressure over bony prominences



Shearing forces

Skin anatomy and physiology⁴

- Epidermis
 - The outer layer of skin sheds every 21 days
- Dermis
 - The middle layer of skin contains nerve endings, blood vessels, oil glands, sweat glands
 - collagen and elastin
- Hypodermis
 - The subcutaneous layer of skin; fat and connective tissue that houses larger blood vessels and nerves



Pressure injury - Stage 1⁴

- Intact skin with non-blanchable redness
- A change in the skin temperature (warm or coolness)
- Tissue consistency has a firm or boggy feel
- Possible patient sensation pain or itching

⁴ National Pressure Ulcer Advisory Panel (NPUAP) www.npuap.org.

Stage 1 Pressure Injury









Pressure injury - Stage 2⁴

- Partial thickness loss of skin involving epidermis and/or dermis
- Presents as a intact or open serum filled blister or shallow crater

Stage 2 Pressure Injury



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⁴National Pressure Ulcer Advisory Panel (NPUAP) www.npuap.org.

Pressure injury - Stage 3⁴

- Full thickness tissue loss involving damage to or necrosis of subcutaneous tissue
- May extend down to, but not through, underlying fascia
- Presents as a deep crater which may include undermining or tunneling

Stage 3 Pressure Injury



⁴National Pressure Ulcer Advisory Panel (NPUAP) www.npuap.org.

Pressure injury - Stage 4⁴

- Full thickness tissue loss with extensive destruction
- Exposed bone, muscle or tendon
- Some slough or eschar may be present

Stage 4 Pressure Injury



⁴National Pressure Ulcer Advisory Panel (NPUAP) www.npuap.org.

Risk factors for hospital-acquired pressure ulcers⁵ (HAPU)

• Age

- Trauma from friction and shearing forces
- Poor nutrition
- Low blood pressure (low perfusion)
- Extended use of NIV



Considerations for mask selection

Did you know? Up to 37.5% of NIV failures are related to the mask intolerance and discomfort⁶

⁶ Squardone, E., Frigerio, P., Fogliati, C., Gregoretti, C., Conti, G., Anonelli, M., Costa, R., Baiardi, P., Navalesi, P. Noninvasive vs invasive ventilation in COPD patients with severe acute respiratory failure. Intensive Care Med (2004) 30: 1303-1310.

Mask design considerations⁸

- Estimated length of use
- Compatibility with NIV device
- Mask safety features
 - Quick release clips
 - Anti-asphyxia valves
- Facial features
 - Skin condition
 - Facial abnormalities
- Elbow / Ventilator compatibility
 - EE
 - SE



Patient considerations⁹

- Mouth breather
- Claustrophobic
- Level of consciousness
- Cooperation
- Facial structure
- Elbow style
- Size matters



Choosing the right mask for your patient

- Mask types
- Headgear selection
- Soft, self-sealing cushions
- Anti-asphyxia features



Initial assessment



- All patients should be assessed for skin integrity upon admission
- Assessment of risk factors for HAPU should also be determined on admission and prior to NIV initiation
- Assess the patient using the Braden scale
- Relative risk should determine monitoring frequency and prevention strategy

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Polling question



Patient assessment





Mask rotation practices



By rotating mask designs, the pressure points are redistributed to help reduce the potential for skin breakdown

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Best practices



Saving Face Strategies to reduce skin breakdown during NIV for patient care





Visit www.thinkniv.com

In literature⁸



Noninvasive ventilation masks are associated with pressure injuries under the mask

Sampling

- 5 ICUs (111 ICU beds)
- Recruited 200 patients with NIV orders
 - First 100 patients received Oro-nasal mask
 - Second 100 patients received Full-face mask

Education

- Therapists and nurses practiced application and proper adjustments of the masks on a mannequin.
 Patient assessed
- Skin integrity
- Comfort level



In literature⁸



Results

- 20% of patients in the oro-nasal masks developed a pressure injury
- 2% of patients in the full-face masks developed a pressure injury
- Comfort scores significantly lower in the Full-face mask group

Conclusion:

Full-Face mask resulted in significantly fewer pressure injuries and was more comfortable for patients.

Summary - Helping reduce the potential for pressure injuries

- Assess the patient
- Select the proper mask(s) design
- Rotate designs to redistribute pressure points
- Manage mask leak no less than 7 L/min
- Perform skin care and early interventions
- Conduct continuing education



