Developing a Protocol for Intensive Care Patients at High Risk for Pressure Ulcers

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In the fourth quarter of 2008, a young, morbidly obese patient in the intensive care unit (ICU) at Hunterdon Medical Center had a unit-acquired stage III pressure ulcer. The patient, who had been receiving mechanical ventilation for 32 days, had significant vasopressor requirements and a prolonged ICU stay. This pressure ulcer was our call to action. A multidisciplinary root cause analysis was conducted after the patient was discharged, and the following were identified as possible contributors to the development of the pressure ulcer:

1. Morbid obesity contributing to sacral pressure and moisture trapping
2. Significant vasopressor requirement for an extended period leading to decreased circulation to periphery
3. Mechanical ventilation requiring that the head of the patient’s bed be elevated at least 30° to prevent ventilator-associated pneumonia also contributing to sacral pressure
4. Braden scale score 12 (high risk for pressure ulcer)
5. Fitted sheet and multiple pink pads creating barrier between therapeutic mattress and patient
6. Pink pads trap moisture against skin as they do not possess a moisture-wicking property
7. Increased shear when positioning patient with pink pad over fitted sheet

In reviewing this patient’s case, it was clear that we had no control over certain factors: morbid obesity, the score of 12 on the Braden Scale, the mechanical ventilation, and the high vasopressor requirement. We could, however, control the amount and quality of the barriers between the patient and the therapeutic mattress. With this in mind, our certified wound care nurse and the ICU clinical coordinator decided to collaborate on formulating an evidence-based protocol to manage moisture and minimize linen layers, thereby promoting skin integrity in high-risk patients. A literature review revealed the following:

- National Database of Nursing Quality Indicators report that facility-acquired pressure ulcer rates for critical care units range between 7.14% and 14.5%.
- A score of 10 to 12 on the Braden Scale indicates that a patient is at high risk for developing a pressure ulcer. Recommendations include initiating a protocol that increases frequency of turning and management of moisture, friction, and shear.
- Alteration in pressure and microclimate can cause skin breakdown. The use of multiple layers of linen can increase interface pressure in the sacral areas.
- Acute illness and associated hemodynamic factors may play a role in pressure ulcer development in critically ill patients.
- Use of reverse Trendelenberg positioning can help prevent ventilator-associated pneumonia in obese patients receiving mechanical ventilation.
Although publications addressed factors such as linen layers, moisture trapping, and head-of-bed positioning individually, surprisingly, none included discussion of any existing protocols that considered all these factors collectively to prevent high-risk patients from getting pressure ulcers. It seemed that we would have to come up with a protocol of our own.

Based on the ideas generated from the root cause analysis and the literature review, our certified wound care nurse suggested some risk-reduction strategies to be tried in the ICU for all patients with a score of 12 or less on the Braden Scale. We decided to call it the “High Risk for Pressure Ulcer Protocol.” The strategies were as follows:

- Use fewer barriers between the critically ill patient and the bed to reduce friction
- Use a flat sheet instead of the fitted sheet for these specific patients. Use a moisture wicking underpad, instead of the heavy pink pads, to reduce friction and to enable easier movement of the patient
- Reposition patient by sliding flat sheet along a maximum inflated mattress
- SBAR (situation-background-assessment-recommendation) report to be given nurse to nurse to ensure consistent use of protocol
- Try the reverse Trendelenberg position on bariatric patients who are receiving mechanical ventilation

For years, the practice in our ICU has been to evaluate patients for pressure ulcer risk by using the Braden Scale on admission and every shift thereafter. Any ICU patient with a score of 12 or less on the Braden Scale upon admission or at any point in their ICU stay will trigger the High Risk for Pressure Ulcer Protocol and the following actions:

- Referral to the certified wound care nurse
- Removal of fitted sheet and pink pad on the bed and replacement with a flat sheet and a moisture-wicking underpad
- For patients receiving mechanical ventilation or any patient who requires head-of-bed elevation for safety, the head-of-bed elevation will be achieved by a combination of traditional head-of-bed elevation and reverse Trendelenberg position
- Moving a patient up in bed will be achieved by sliding a flat sheet along a maximum inflated mattress
- Wrinkles are removed from the sheet by having 2 people on opposite sides of the bed pull the sheet toward themselves

Before we could hope to use this new strategy for reducing the number of pressure ulcers within the unit, education of key players and of the staff in general would be crucial. Our wound care nurse and the ICU clinical coordinator called the unit’s pressure ulcer prevention team together for a meeting. The team consists of a few ICU staff nurses and the day-shift patient care assistant. The proposed protocol was reviewed, and support and reinforcement were agreed upon by all members. The wound care nurse gave a presentation at a staff meeting and a trifold poster presentation of the protocol was displayed in the break room for ongoing reinforcement. Daily rounds by the ICU clinical coordinator ensured that the protocol was initiated on all appropriate patients.

One pleasant surprise during the transition process was that our patient care assistant turned out to be a true “champion” of the protocol. Daily patient baths are initiated by her, so she found herself in the position of promoting the protocol when appropriate, during the changing of bed linens. Very often, it was at her suggestion that the traditional bed linens were removed and the protocol linens applied. Acceptance of the protocol by the ICU nurses was assisted by the enthusiastic efforts of our patient care assistant.

Once members of the ICU staff were comfortable with the principles and procedures of the High Risk for Pressure Ulcer Protocol, it was time to begin measurements. The procedure was as follows:

1. Patient’s score on the Braden Scale and skin condition will be noted when the protocol is started
2. Patient’s score on the Braden Scale and skin condition will be noted when the patient is transferred or discharged from the ICU
3. Data will be collected by the ICU clinical coordinator in cooperation with the ICU nurses and the certified wound care nurse

Data were collected from March through November 2009. Fifty patients met the criteria and were admitted into the protocol. Patients were divided into 4 groups based on their ICU length of stay: 1 to 5 days (Figure 1), 6 to 10 days (Figure 2), 11 to 15 days (Figure 3), and 16 or more days (Figure 4).
In 2 of the 50 (4%), skin condition worsened. In both of those cases, the patient’s skin condition went from intact to a reddened sacrum (stage I).

Plans for the future include expanding the use of this protocol to other patient care units in Hunterdon Medical Center. With this

Conclusions and Future Plans

The interventions of collectively reducing sacral pressure, reducing friction and shear, and diverting moisture away from the patient’s skin as described in this protocol had a positive impact on preventing pressure ulcers or preventing further deterioration of already compromised skin in high-risk patients. Skin condition remained unchanged from admission to discharge from the ICU in 38 of 50 high-risk critically ill patients (78%). Skin condition actually improved during their ICU stay in 10 of the 50 high-risk critically ill patients (20%). In 2 of the 50 (4%), skin condition worsened. In both of those cases, the patient’s skin condition went from intact to a reddened sacrum (stage I).

Plans for the future include expanding the use of this protocol to other patient care units in Hunterdon Medical Center. With this.
idea in mind, a trifold presentation of the protocol and preliminary results was featured in our hospital’s annual research and education days. The feedback from these presentations was overwhelmingly positive, setting the stage for what we hope will be an easy transition to using the protocol throughout our hospital. We hope to share our protocol and findings with other hospitals in the interest of improving patient safety.

Financial Disclosures
None reported.

References

Figure 3  Comparison of skin condition at admission and upon discharge from the intensive care unit (ICU) among 8 patients at high risk for pressure ulcers who stayed in the ICU for 11 to 15 days. Skin condition remained the same in 63%, improved in 25%, and worsened (from intact to stage I) in 12%. Skin conditions: 1 = intact, 2 = stage I, 3 = stage II, 4 = stage III, 5 = stage IV, 6 = unstageable.

Figure 4  Comparison of skin condition at admission and upon discharge from the intensive care unit (ICU) among 6 patients at high risk for pressure ulcers who stayed in the ICU for 16 days or longer. Skin condition remained the same in 67%, improved in 33%, and did not worsen in any patients. Skin conditions: 1 = intact, 2 = stage I, 3 = stage II, 4 = stage III, 5 = stage IV, 6 = unstageable.
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