



Reducing Pressure Ulcer Development in the ICU

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Introduction

There are numerous algorithms and protocols designed to assist institutions motivated to decrease the rate of hospital acquired pressure ulcers. Our facility adopted a multidisciplinary program which included the incorporation of pressure-sensing mattress overlays with real-time digital imaging. This program reinforced the National Pressure Ulcer Advisory Panel guidelines, dedicated educators, and readily available appropriate support surfaces and patient positioning equipment. The role of the pressure monitor was to provide better feedback to the bedside nurse and to confirm effective patient repositioning (EPR). We define EPR as offloading of at-risk tissue in conjunction with objective confirmation of pressure relief at that location. We review our experience as a retrospective review.

Methods

- A retrospective cohort study was designed and performed. The hospital electronic record, Metavision® (iMDsoft, Needham, MA) and corporate database Biweb® (Hummingbird, Toronto, ON) were queried for the study dates. Patients with documentation of pressure ulcers were confirmed by manual audit of the medical records. This also confirmed whether the ulcer was present on admission.
- Bedside pressure mapping systems were placed on 20 standard MICU beds. The M.A.P.™ System, Wellsense USA, Inc., Nashville, TN. Educators were deployed on the unit to instruct and assist with implementation of the NPUAP guidelines. Weekly prevalence audits were performed throughout the study period.
- The mapping systems provided real-time pressure readings and imaging. The goal was to provide data regarding time for turning, as well as evidence that the pressure was relieved and a result of effective patient repositioning.
- Results were compared to historical controls for the same beds one year prior.
- Comorbidities and confounding factors were developed from the literature and used to compare the 2 populations.
- Institutional Review Board policies and procedures were followed.

Image of patient prior to repositioning

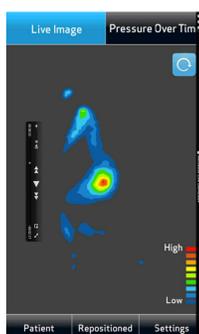


Image after effective patient repositioning



Results

Results: The study period was January and February 2011. All patients admitted to selected MICU beds were included in the study group. A total of 8 weekly audits were conducted during the study period. During the study interval, one patient developed a pressure ulcer (0.3 %) while in the MICU. The prevalence rate one year prior for the same months and beds was 5% (16 pressure ulcers). We compared demographic and acuity information for the 2 cohort populations. These data are on the table below. In general, the 2 populations were comparable. In fact, the treatment group may have been higher acuity. Despite higher acuity, focus on pressure ulcer reduction via effective patient repositioning resulted in decreased institution-related pressure ulcers.

Other factors compared that were not statistically significant included age, race, gender, recent surgery, associated co-morbidities, history of previous pressure ulcers, immunosuppression, spinal cord injury, vasopressor use in MICU, number of patients on ventilator, average Braden score .

There were no technical or safety concerns with the device during the study period. Nurses and caregivers provided feedback suggesting overall acceptance and value-added benefit to patient care.

Comparison of Study Populations A: Control Group B. Treatment Group (EPR)

Group	A	B
Total Patients	320	307
Mean days in ICU*	6.16	6.54
Average Ventilator Days	5.55	6.28
PEEP >8	15	29
Serum Lactate > 4.0 mmol/L*	37	60
APACHE II > 20 *	60	118
Avg Comorbidities / Patient	7.1	5.8
Patients with Braden<=12	94	107
Pre-existing Pressure Ulcers	5	7
Institution-related pressure ulcers*	16	1

* Statistical significance for student's t-test at p < 0.05

Conclusions

- Bedside ICU nursing can benefit from additional modalities for pressure ulcer intervention**
- A low profile mattress overlay with real time feedback is accepted by caregivers and patients in the ICU**
- Effective patient repositioning is an important component of a successful pressure ulcer prevention protocol in the ICU setting**
- Pressure ulcer incidence may be decreased by technology that confirms effective patient repositioning.**

Discussion

There are many strategies for improving clinical outcomes. We used innovative technology at our institution in order to achieve the desired effect. We have advanced the concept of effective patient repositioning (EPR) among our caregivers. The components of EPR include education, appropriate support surfaces and positioning equipment, and objective reliable confirmation of pressure relief. The bedside pressure mapping system was well-received by the nursing staff and well-tolerated by the patients. It provided much needed real time visual feedback and confirmed that pressure is in fact being offloaded during patient repositioning. Pressure mapping with real time feedback can give effective clinical improvement in high-risk patients with very little ramp-up.

The ICU in many institutions is a high risk area for institution related pressure ulcers. This strategy suggests that the problem is solvable.

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