

KEEPING HEELS INTACT

Evaluation of a Protocol for Prevention of Facility-Acquired Heel Pressure Ulcers

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► ABSTRACT

Problem

Monitoring from one Midwestern hospital demonstrated a rising prevalence of heel facility-acquired pressure ulcers (FAPUs) to unacceptable levels, despite being in accordance with national trends.

Purpose

1) To improve the identification of risk factors (Braden score and co-morbidities) instrumental in identifying those patients most vulnerable for heel skin breakdown; and 2) To determine if frequent assessment and documentation of heel skin integrity in concert with early and aggressive implementation of pressure-reducing and pressure-relieving devices would decrease the prevalence rate of FAPUs.

Methods

Pretest: Conducted retrospective chart review of patients who were admitted with or developed heel pressure ulcers over a two-year period in order to identify those risk factors most predictive of skin breakdowns.

Intervention: Over a ten-day period, assessed patients with revised criteria as "at risk" received tailored heel pressure ulcer prevention interventions. Over a second ten-day period, assessed patients with revised criteria as "at risk" received tailored heel pressure ulcer prevention interventions, including use of a trial heel pressure-relieving product.



Findings

The pretest revealed variables that were statistically significant between those patients who acquired heel ulcers during their hospital stay or prior to their admission, including diabetes, peripheral vascular disease (PVD), low albumin and Braden

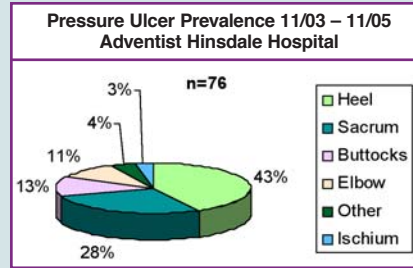
score. After the intervention, no heel FAPUs were attributed to the intervention units during the study period. Of the two patients who acquired heel ulcers during the study period, both were in the control group and would have met the revised criteria for interventions. Risks of cerebral vascular accident (CVA), PVD, low albumin, and hip fracture were identified in this group. Statistical difference was demonstrated between the current heel pressure relief device and the trial product for evaluation.

Conclusion

A pressure ulcer prevention protocol that incorporates accurate assessment of risk factors (Braden score and co-morbidities) with frequent documentation of heel skin integrity has an impact on the prevalence of heel FAPUs. In addition, early, aggressive implementation of pressure-reducing and pressure-relieving devices is effective in reducing the rate of this important nursing-sensitive outcome.

PROBLEM

- Improvement needed in prevention of facility-acquired heel pressure ulcers (FAPUs).
- Heel pressure ulcers account for 30.3% of total pressure ulcers, and are the second most common site for skin breakdown.¹
- The national incidence of FAPUs has steadily increased from 19% - 30% over the past decade.²
- Quarterly data showed that the prevalence of heel FAPUs had steadily increased at one Midwestern community hospital in accordance with national trends.
- The heel was the site of the FAPU 43% of the time at this hospital, higher than comparable national data.
- Many of the patients who developed heel FAPUs had Braden scores in the least risk range of 18-15.



BACKGROUND

- Pressure ulcers affect both physical health and psychosocial functioning.
- FAPUs of the heel may result in a disruption of mobility resulting in the development of iatrogenic consequences, thereby increasing length of stay, inconvenience, and medical costs.³
- Complex heel pressure ulcers represent one of the most costly complications in the elderly.⁴
- Costs to treat pressure ulcers range from \$2,000 to \$30,000 and can be as high as \$70,000 for a complex, full-thickness pressure ulcer.⁵
- The annual cost of treating (FAPUs) is estimated at \$2.2 to \$3.6 billion.⁴

METHODS

Purpose

- To determine if assessment of co-morbidities in addition to Braden scores would improve identification of patients at risk.
- To determine if early and aggressive implementation of pressure-reducing and pressure-relieving devices in concert with more frequent assessment and documentation of heel skin integrity would decrease the prevalence rate at this hospital.

This prospective intervention study with control group was conducted after chart audits to determine an improved method for identifying patients at risk for skin breakdown. The study began after IRB Approval.

Pretest

A retrospective chart review of 70 medical records was conducted in 2005 in order to determine risk factors of those who were admitted with or developed heel pressure ulcers over a two-year period.

Intervention

Over a ten-day period, Braden scores and co-morbidities were assessed using the research study protocol. Assessment of co-morbidities included: diabetes, current vasopressor therapy, peripheral vascular disease, cerebral vascular accident, paraplegia/hemiparesis, hip fracture/total knee replacement, and low albumin. For patients who met inclusion criteria (Braden score \leq 18), tailored heel pressure ulcer prevention interventions were implemented according to the research protocol.

Product Comparison

There were patient and staff satisfaction concerns related to the current heel pressure-relieving product. It was felt that a change in product for heel pressure relief might improve patient outcomes and be more acceptable to patients and staff. During the second phase of the intervention, the same research study protocol was

used; however, a new heel pressure-relieving product was utilized.

Over a second ten-day period, staff utilized and evaluated a new heel pressure-relieving product with results compared to the control group that used the usual and customary protocol and products.

Braden Risk Score	Additional Risk Factors for Development of Heel Pressure Ulcers Present	Intervention
18-17	Any	Pressure-relieving heel elevator boots
18-17	None	Pressure-reducing heel protector socks
16 or less	All patients	Pressure-relieving heel elevator boots

	# Patients eligible during 10-day period	# Patients who met inclusion criteria during 10-day period	# Patients assessed on Prevalence Day	# Patients who met inclusion criteria on Prevalence Day
Intervention Unit: CCU	40	19	14	8
Intervention Unit: 2 surgical	115	27	39	8
Control Unit: ICU			10	8
Control Unit: 2 Medical			33	20

	# Patients eligible during 10-day period	# Patients who met inclusion criteria during 10-day period	# Patients assessed on Prevalence Day	# Patients who met inclusion criteria on Prevalence Day
Intervention Unit: CCU	41	20	14	7
Control Unit: ICU			8	6

RESULTS

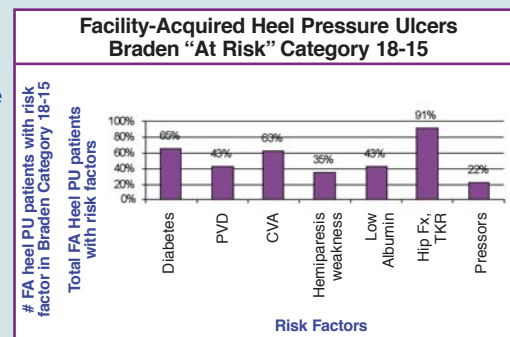
Pretest Results

Ninety-one percent of the patients who were hospitalized for hip fracture or total knee replacement surgery and developed a FAPU had Braden scores in the "least risk" category 18-15. Diabetic patients and patients with a history of CVA who developed FAPUs were also more often in the Braden "least risk" category.

Statistical analysis of the differences between patients who acquired heel ulcers during their hospital stay or prior to admission revealed five variables of significance:

Patients admitted with heel ulcers:

- Level (stage) of skin breakdown was worse for patients admitted with the injury: $t = 2.39(68)$, $p = .02$
- Patients had lower Braden scores: $t = 2.21(68)$, $p = .03$



- Patients more likely to be diabetic $\chi^2 = 4.08$, $p = .04$
- Patients more likely to have peripheral vascular disease: $\chi^2 = 9.71$, $p < .01$
- Patients more likely to receive a referral to the wound care nurse $\chi^2 = 10.13$, $p < .01$

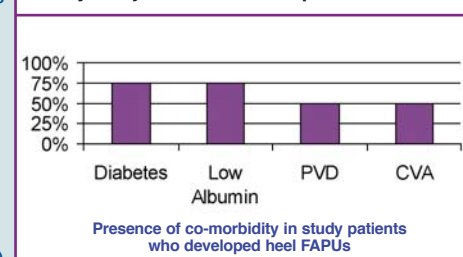
In logistic regression, accounting for 56% of the variance in skin breakdown, the following components were significant in predicting which patients would develop FAPUs: plegia/paresis, vasopressors, diabetes, PVD and low albumin.

Intervention Results

High-Risk Patients Identified

- 46 patients distributed across two units: 2S (N=13) and CCU (N=33)
- Mean age of 74.95
- 59% female
- Average Braden of 14.96 (range 10-18; mode 18)

Study Subjects Who Developed Heel FAPUs



High-Risk Patients Who Developed Heel Pressure Ulcers

- 4 heel ulcers developed during the study period.
- No significant difference in skin breakdown by age or Braden score.
- Heel breakdowns equally distributed between the two intervention units. The four heel FAPU patients found on the intervention units were transferred into the units, and all were post-op patients. Three of the four were transferred from critical care. All would have met "at risk" criteria but did not receive the intervention prior to transfer to the intervention unit.

Prevalence Day Results (Control vs. Intervention)

Patients in control and intervention units had similar patient characteristics and risk factors

Significantly Different Outcomes

- There was a statistically significant difference between the prevalence of heel breakdowns with three occurring on the control group (of these, two were on one patient—bilateral heel FAPUs) and one occurring on the intervention group. $*** \chi^2 = 86.37$, $p < .01$
- The patient on the intervention unit who developed the heel pressure ulcer was not using the heel pressure-relieving product.
- Overall, among the 53 patients on the intervention units who were using the pressure-relieving products, 0 heel ulcers developed.
- Among the 8 patients with hip fractures on the intervention unit who were using the pressure-relieving product, 0 heel ulcers developed. On the control unit, 1 patient with a hip fracture developed a heel pressure ulcer. This patient would have met inclusion criteria on the intervention unit.

Trial Product Evaluation

Statistical difference was demonstrated between the current heel pressure relief device and the trial product for evaluation.

- Questionnaires were completed at the conclusion of each intervention phase (16 evaluated current product, 8 evaluated new product).
- Both products received high scores on recommending product for use: 3.18 (current product) mean score vs. 3.49 (trial product) mean score (on 1-4 scale).
- Overall, both products ranked highly, with only two mean scores less than 3.0 (1-4 scale) – both were evaluations of current product for "stays in place" and "not too warm."

- Overall, the evaluators ranked the trial product at a higher level that was statistically significant $t = 2.19(2,22)$, $p = .04$.
- Trial product ranked higher on all measures except for ease of removal (though not at a statistically significant level).
- Statistically significant, higher scores for trial product on:
 - Comfortable interior
 - Not too warm
 - No hard, sharp, or, rough edges
 - Protects heels from pressure, friction and shear
 - DVT prevention compression devices compatibility
 - Floats the heel for total pressure relief



RELEVANCE TO NURSING PRACTICE

- Prevention strategies included a combination of education, increasing staff awareness, accurate assessment of risk, more frequent heel assessment, and appropriate balance among different prevention products.
- The strategies needed to be evidence-based and cost-effective, produce quality outcomes, and result in patient and staff satisfaction.
- As part of daily nursing assessment, individualized risk factor identification was effective in reducing the risk of developing heel FAPUs for patients in the Braden "least risk" category 18-15.
- Use of tailored prevention interventions, as part of the individualized care planning process, was effective in reducing the risk of developing heel FAPUs.
- Other factors important to the success of this study:
 - Pressure-relieving products were used consistently
 - Unit-based, skin resource nurse helped ensure staff compliance
 - Heightened awareness of pressure ulcer risk assessment and prevention interventions
 - Staff was involved in selecting the most effective prevention product
 - Staff took ownership of this important nurse-sensitive outcome

CONCLUSION

This study demonstrated that the consistent use of a standardized pressure ulcer prevention protocol—which incorporates early, aggressive implementation of pressure-relieving devices based on accurate assessment of Braden Scale scores, in conjunction with assessment of individual co-morbidities—is effective in reducing the risk of developing heel facility-acquired pressure ulcers. Frequent assessment and documentation of heel skin integrity as a standard of care impacts this important nursing-sensitive outcome.

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