Technical Note

How to reduce hospital-acquired pressure ulcers on a neuroscience unit with a skin and wound assessment team

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Received: 01 June 12 Accepted: 01 June 12 Published: 20 November 12

This article may be cited as:
McGuinness J, Persaud-Roberts S, Marra S, Ramos J, Toscano D, Policastro L, Epstein NE. How to reduce hospital-acquired pressure ulcers on a neuroscience unit with a skin and wound assessment team. Surg Neurol Int 2012;3:138.

Available FREE in open access from: http://www.surgicalneurologyint.com/text.asp?2012/3/1/138/103645

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Abstract

Background: In 2008, the incidence of hospital acquired pressure ulcers (HAPUs) continued to increase on a neuroscience unit that included both neurosurgical and neurological patients in a 14-bed intensive care unit, and in a 18-bed floor unit.

Methods: To reduce HAPUs, several changes were instituted in 2008; (1) turning patients every 1–2 h/repositioning, (2) specialty beds, and (3) a “skin and wound assessment team (SWAT)” that included one (or two) “expert” nurses/nursing assistants who made rounds on all the patients in the unit at least once a week. They would examine patients from “head to toe”, document/measure all pressure ulcers, and educate primary nurses/nurse assistants on the plan/products needed for the patients wound care based on their assessments. In 2010, further measures included: (1) adding eight Stryker beds, (2) adding pressure relieving heel protector boots, and (3) requiring that all new hospital orientees work one shift (7.5 h) shadowing the SWAT team.

Results: The SWAT team initially decreased HAPUs by 48% in 2009; this reduction was further increased in 2010 (57%), and 2011 (61%). Additionally, in 2010, the SWAT team was required to educate nurses in all other units. By 2011, all nurses had to complete the hospital acquired pressure ulcer prevention tutorial.

Conclusions: Since instituting a specialized SWAT team for our neuroscience unit, the incidence of HAPUs (cost estimated for grade IV, US $129,248) was decreased by 48% in 2009, by 57% in 2010, and by 61% in 2011. The SWAT program is now hospital-wide.

Key Words: Hospital-acquired pressure ulcers, Neuroscience unit, Skin and wound assessment teams

INTRODUCTION

Hospital-acquired pressure ulcers (HAPUs) are estimated to cost US $2.2 billion (1999) per year in the United States. Furthermore, stage IV HAPUs have been reported by some to cost an average of US $129,248 for
just a single hospital admission.\textsuperscript{3,9} In a neuroscience unit, HAPUs may be uniquely attributed to patients’ compromised neurological function e.g. comatose status, paralyzed state, and/or dependence on a respirator which limits their ability to move themselves. As pressure sores increase morbidity and mortality rates in patients on neuroscience units, nursing directors are always looking for measures to prevent HAPUs by utilizing various programmatic and therapeutic maneuvers. In our neuroscience unit, the nursing administrators and their staff devised a specialized skin and wound assessment team (SWAT) to both monitor and prevent HAPUs. Their aim was to accomplish this without increasing staff costs (no new nurses hired, no overtime), while reducing/avoiding the high average costs reported for HAPUs. Furthermore, cost savings are particularly critical as Medicare and Medicaid Services are increasingly not reimbursing institutions for hospital-acquired conditions including HAPUs.\textsuperscript{6}

\textbf{MATERIALS AND METHODS}

In 2008, the new nurse managers of the neuroscience (neurology/neurosurgery) units (Neuroscience ICU: 14 beds, and neuroscience 18 floor beds) were given a directive: to decrease the units’ HAPUs that had been steadily increasing. The first directives included: (1) turning and positioning patients every 2 h, (2) utilizing specialty beds when necessary, and (3) forming a “skin and wound assessment team (SWAT)” [Table 1]. The latter would consist of two “expert” nurses, and two nursing assistants who would round on all neuroscience patients at least once a week, and attend monthly conferences. All patients would be examined from head to toe, and members of the SWAT team would be responsible for documenting, measuring ulcers, and educating primary nurses/nursing assistants as to how to perform these tasks [Table 1]. If nurses encountered any “skin issues”, they knew to contact the “skin nurse” from the SWAT team.

In 2010, further improvements were added and included: (1) Eight Stryker (specialty) beds for high risk ICU patients, (2) heel off lifting apparatus/boots for all vented and immobile patients, and (3) the continuation of the SWAT weekly rounds [Table 1]. Also in 2010, the National Database of Nursing Quality Indicators (NDNQI) was introduced to foster the development of “experts” in skin care. The SWAT team, nurses, and nurse managers all took part in the NDNQI training program, and began collecting data, and reporting the quarterly prevalence of HAPUs.

The SWAT team trialed many different skin care products and positioning devices, and introduced the most successful product choices. Furthermore, all registered nurse orientees were required to shadow the SWAT team for a 7.5-h shift [Table 1]. During the training, they received a packet including a checklist with skin care reference guides such as the Braden Scale for Predicting Pressure Sore Risk, a Pressure Ulcer Staging Guide, a Guide of Skin Care Products, and Positioning Devices. At the completion of the shadowing, they were expected to take an on-line NDNQI tutorial followed by an examination; once this was completed, they received a certificate documenting their completion of the course.

\textbf{RESULTS}

In 2008, prior to the study, the incidence of HAPU in the Neuroscience ICU (14 beds) was 23; in 2009, the number was reduced to 12 (reduction of 11/23 or 48%); in 2010, it was 10 (reduction of 13/23 or 57%), and finally in 2011, it was only 9 (reduction of 14/23 or 61%) [Figure 1]. The number of HAPUs on the neuroscience floor (18 beds)

Table 1: “Skin care” orientation for registered nurses and nurse assistants

| Directives            | Educational factors                                                                 |
|-----------------------|--------------------------------------------------------------------------------------|
| Handouts received     | Braden scale for predicting pressure sore risk                                       |
| Handouts received     | Pressure ulcer staging guide                                                         |
| Handouts received     | Skin care and wound care products                                                    |
| Handouts received     | Support-positioning devices                                                         |
| Unit orientation      | National Database of Nursing Quality Indicators (NDNQI) tutorial required           |
| Unit orientation      | Each registered nurse and nurse assistant must follow/participate in weekly skin care rounds with “skin care team” (one shift) |
| Unit orientation      | Proper documentation is continually reviewed                                          |
| Unit orientation      | Orientees participate in daily multidisciplinary rounds emphasizing skin care issues /prevention |
| Unit orientation      | Orientees identify and contact the proper resource personnel                         |
| Unit orientation      | Preceptors provide education on skin assessment skills and documentation             |

Figure 1: Neuroscience Units Annual History of the Incidence of Acquired Pressure Ulcers from 2008-2011
started out prior to SWAT at 17 in 2008, and then was, respectively, reduced over the years to 7 (reduction of 10/17 or 59%) in 2009, 6 (reduction of 11/17 or 65%) in 2010, and finally, 3 (reduction of 14/17 or 82%) in 2011. Note that the neuroscience step down unit (six to seven beds) was only opened in 2010 and 2011; during this interval, only 1 HAPU was noted per year.

Therefore, by end of the first year (2009), the SWAT team had successfully decreased the number of Neuroscience ICU HAPUs by 45% and floor HAPUs by 59%. Notably, this was accomplished without incurring any overtime for SWAT team members. By 2010, the reduction of HAPUs was an even greater 57% for the Neuroscience ICU and 65% for the floor. Additionally, in 2010, the SWAT team became hospital-wide. Furthermore, as of 2011, when the reduction was increased to 61% for the Neuroscience ICU, and 82% for the floor, all nurses in all hospital units had to complete the NDNQI/HAPU prevention tutorial, and submit a certificate of completion to their nurse managers.

**DISCUSSION**

**Reduction in HAPUs with “best practices”**

In this study, as part of instituting “best practices” for reducing HAPUs, a SWAT team of expert skin and wound care nurses was formed. Their responsibility was primarily educating other nurses and nurse assistants on skin and wound assessment/care on a neuroscience (neurology/neurosurgery) unit (ICU 14 beds/18 floor beds) in one hospital over a 3-year period. Within just the first year (2009), they achieved a 48% reduction in HAPUs in the ICU, and 59% reduction on the floor; these reductions were not only maintained but improved upon by 2010 (ICU 57% reduction, 65% floor reduction), and 2011 (ICU reduction 61%, 82% floor reduction).

**No increased costs for the SWAT team while HAPUs were reduced**

The overall total cost for HAPUs in the United States in 1999 was estimated at US $2.2 billion.[9] Additionally, the average per-patient cost of a stage IV HAPU has been cited as high as US $129,248.[9] Reducing the frequency of HAPUs is, therefore, not only critical for improving patient outcomes, but also for reducing/avoiding the extremely high costs of HAPUs. Another major consideration is that increasingly, the Centers of Medicare and Medicaid Services is instituting regulations for non-payment to hospitals for hospital-acquired conditions that now include pressure ulcers.[6]

**Location of HAPUs**

Vandenkerkhof et al. not only cited the multi-billion dollar costs for HAPU/year, but also noted their typical locations in a series of 12,787 patients.[9] Locations of HAPUs included: the coccyx sacrum (<27%), heel (13%), ankle (<12%), and ischial tuberosity (<10%). In Brem et al.’s study, the “average hospital treatment cost” for treating 11 stage IV hospital-acquired pressure ulcers (HAPUs) was US $129,248 during a single admission, while community acquired pressure ulcers cost an average of US $124,327 over (typically) four admissions.[3] The authors had not anticipated that these costs would be so high, and emphasized that early recognition would eradicate enormous pain and suffering, save thousands of lives, and reduce health care expenditures by millions of dollars.[8] In a separate single case study involving a 27-year-old quadriplegic with a stage IV ischial pressure ulcer, the minimally invasive “external tissue expanders”, required to effect wound closure (cost paid by insurance), was US $43,814.[8] Insurance payments for the entire hospitalization totaled US $242,350, and included US $59,992 for “biological dressings and negative pressure wound therapy”.[8]

**Reduction of HAPUs and costs: Is the SWAT team’s success due to increased awareness?**

Notably, in this study, the reduction in HAPUs was accomplished by the SWAT team without incurring increased hospital nursing costs; there were no new nurses hired for the SWAT team, nurses performed SWAT duties as part of their routine shifts, and there was no overtime. Although one could argue that the reduction in HAPUs, and improvement in skin/wound care reflected simply increased awareness brought about by the SWAT team, it would still be worth reporting as others may similarly reproduce these results. Furthermore, as the SWAT team in this study clearly reduced HAPUs on the neuroscience unit(s), it not only likely decreased patient suffering, but also reduced potential increased HAPU costs (e.g. related prolonged lengths of stay with their attendant morbidity/mortality) that agencies like the Centers for Medicare and Medicaid services will no longer pay for.[6] Unfortunately, we have no specific data regarding our own hospital savings, but again note that Brem et al. found this reached an individual average of US $129,248 for 11 patients with HAPUs for one admission.[3]

**Reduction in HAPUs for different specialties in an acute hospital setting**

Reductions in HAPUs in an acute hospital setting (e.g. in this study’s multifaceted Neuroscience unit) have been reproduced elsewhere in other subspecialties that similarly utilized “best practice” techniques. In Revello et al.’s study, they further substantiated the value of “expert” nursing evaluations of the skin in an acute rehabilitation facility.[7] The methods used included education, biweekly skin rounds, the involvement of both nurses and nursing assistants, and “sharing pressure ulcer data”. They documented not only a reduction in HAPUs to 0% (2008), but also excellent participation from the nursing staffs; 80% of the nurses and 95% of
the nursing assistants attended the teaching sessions. Furthermore, those who did not attend were educated individually to bring compliance up to 100%. The authors concluded that education, skin rounds, nursing assistant participation, and sharing of data were instrumental in improving the frequency of skin assessments, and the reduction of HAPUs in the rehabilitation unit.7

In Barker et al.’s 9-year study, involving the review of 4268 hospital charts, the authors looked at the prevalence of HAPUs utilizing three best practice guidelines: (i) the “use of a validated pressure ulcer risk assessment and intervention checklist”; (ii) the “accuracy of risk assessment scoring” (usual nursing staff vs. experienced injury/ulcer prevention nurses); and (iii) the “use of pressure ulcer prevention strategies”.6 They found that with the specialized nursing program, HAPUs declined to 12.6% in 2 years, and to 2.6% by 6 years. Compliance with the guidelines from the nursing staff (2003–2011) was over 84%. Of interest, the untrained nurses typically underestimated and undertreated patients at risk for pressure ulcers; this finding further validated the need to introduce “expert nurses” into the hospital setting.

Impact of prolonged hospitalization, organ failure, and multiple comorbidities on HAPU

Bry et al. identified multiple additional factors that contribute to the development of HAPUs in hospitalized patients that are typically beyond the control of the nursing/medical staff.4 These include extended hospital or extended health care facility stays, at least one system organ failure, and a multiplicity of comorbidities. Specifically Bry et al. noted that 80% of patients with a single hospital-acquired pressure ulcer (1-HAPU) had six or more comorbid factors, while an additional two-thirds exhibited at least one organ system failure. Furthermore, despite the typical utilization of four out of five different “interventions” to limit HAPUs, 84.1% of patients developed at least 1 HAPU.

Limiting HAPU utilizing “low air loss weight-based pressure redistribution-microclimate management system beds”

One of the multiple adjunctive techniques that have evolved to limit HAPUs, includes the development of various “specialty beds”. In Black et al.’s study, the authors compared the HAPU incidence and progression for 52 critically ill cardiovascular patients utilizing two different support surfaces/beds.2 Thirty-one patients utilized “low air loss weight-based pressure redistribution-microclimate management system beds”, while the remaining 21 received “integrated powered air pressure redistribution beds.” The frequency of pressure ulcers on the buttocks, sacrum, or coccyx was 0/31 or 0% for the former, but a much higher 18% (4/21) for the latter. Furthermore, ulcers worsened in two patients using the latter mattresses, which cost an additional US $4,116 for specially bed rentals.

Reduction of sacral pressure ulcers with silicone border foam dressing

In Chaiken et al.’s study, the authors assessed whether a silicone border foam dressing would decrease the frequency of sacral pressure ulcers seen in an intensive care unit setting involving critically ill medical and postoperative adult patients.5 The 273 adults in the study averaged 65 years of age. For the 35 months prior to introducing the silicone dressing, sacral HAPUs occurred in 13.6% of patients. Six months following the introduction of silicone-bordered foam dressings, during which time the sacral area was assessed twice daily, the comparative incidence of silicone-bordering ulceration was reduced to 1.8%. Of further note was the high mortality rate for patients with deep sacral HAPUs as three of the five with “suspected deep tissue injuries” later died, while one of the remaining two patients who developed stage 2 pressure ulcers also later expired.

SUMMARY

The introduction of expert skin and wound assessment teams or “SWAT” teams to routinely assess the skin of acutely ill patients, whether in neuroscience, cardiovascular, rehabilitation, or other medical/postoperative units, appears to be an effective method for reducing HAPUs which reportedly can cost up to US $129,248. Furthermore, the same nursing staff (e.g. without new hires, without overtime, and without increasing costs) may be utilized to create these SWAT teams. Not only do patients benefit from the reduction of HAPUs (reduced morbidity/mortality), but they may also enjoy potentially shorter hospitalizations, incurring lower costs. Additionally, as hospitals may no longer be reimbursed by many insurers, including the Centers of Medicare and Medicaid Services for hospital-acquired conditions that include HAPUs, the development of SWAT teams becomes even more essential.6 Finally, the value of both educating and motivating nurses and nursing assistants to provide excellent skin care and limit/eliminate HAPUs should never be undervalued, and must be considered a mainstay of success as documented in this study as well as other studies.

REFERENCES

1. Barker AL, Kamar J, Tyndall TJ, White L, Hutchinson A, Klopf N, et al. Implementation of pressure ulcer prevention best practice recommendations in acute care: An observational study. Int Wound J 2012;39:267-73.
2. Black J, Berke C, Urzendowski G. Pressure ulcer incidence and progression in critically ill subjects: Influence of low air loss mattress versus a powered air pressure redistribution mattress. J Wound Ostomy Continence Nurs 2012;39:274-81.
3. Brem H, Maggi J, Nierman D, Rolinitzky L, Bell D, Rennert R, et al. High cost of stage IV pressure ulcers. Am J Surg 2010;200:473-7.
4. Bry KE, Buesher D, Sandrik M. Never say never: A descriptive study of hospital-acquired pressure ulcers in a hospital setting. J Wound Ostomy Continence Nurs 2012;39:274-81.
5. Chaiken N. Reduction of sacral pressure ulcers in the intensive care unit using a silicone border foam dressing. J Wound Ostomy Continence Nurs 2012;39:143-5.

6. Delmore B, Lebovits S, Baldock P, Suggs B, Ayello EA. Pressure ulcer prevention program: A journey. J Wound Ostomy Continence Nurs 2011;38:505-13.

7. Revello K, Fields W. A performance improvement project to increase nursing compliance with skin assessments in a rehabilitation unit. Rehabil Nurs 2012;37:37-42.

8. Schessel ES, Ger R, Oddsen R. The costs and outcomes of treating a deep pressure ulcer in a patient with quadriplegia. Ostomy Wound Manage 2012;58:41-6.

9. Vandenkerkhof EG, Friedberg E, Harrison MB. Prevalence and risk of pressure ulcers in acute care following implementation of practice guidelines: Annual pressure ulcer prevalence census 1994-2008. J Healthc Qual 2011 [In press]

Disclaimer: The authors of this paper have received no outside funding and have nothing to disclose.