A Pilot Study:
Can Heel Protectors Prevent Pressure Ulcers in the OR?

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Introduction

Surgical patients are at an increased risk of developing pressure ulcers (PUs). Rates of pressure ulceration ranged from 3.5% in a cross-sectional study (N = 281) to 14.3% in a prospective comparative study (N = 286). A smaller study in 50 elderly patients showed that 13% of patients undergoing elective surgery and 14.2% of patients undergoing surgery for hip fracture developed PUs.

Bony prominences, such as the heel, are more prone than other anatomic sites to the development of PUs; indeed, heel ulcers are the most common facility-acquired PU. The average incidence of PUs in US hospitals is 7%, approximately 30% of which are heel ulcers. The rate of heel ulcers in surgical patients may be even higher; one study showed a 23% incidence of perioperative PUs, and 61 of the 118 PUs (52%) recorded were located on the heel.

Research has shown that patients undergoing prolonged surgery are at higher risk of developing a PU. In addition, certain types of anesthesia and surgical positioning increase the risk of PU development. Additional research has shown that prolonged immobility in the pre- and postoperative periods are also associated with PU development immediately postoperatively.

In addition, the non-reimbursement rules of the Centers for Medicare and Medicaid (CMS) target conditions that are reasonably preventable through the application of evidence-based guidelines. Per these rules, which took effect in October 2008, the CMS will deny reimbursement for any PUs that develop during hospitalization or for any stage I or II ulcers that progress to a stage III or IV ulcer during hospitalization, unless documentation is available showing that the development or worsening of the PU was unavoidable. CMS estimates the cost of treating just one Stage III or IV pressure ulcer is $43,180.

There are various ways to protect vulnerable tissue against external mechanical forces such as pressure, friction, and shear. Although pillows can be used for heel offloading, they have several disadvantages: differences in size and density affect patient comfort; patient movement and gravity can alter the pillow’s position, placing the heel against the bed surface; and pillows do not prevent plantar flexion contracture or lateral lower limb rotation. Heel-offloading devices are more efficient and effective because they remain in contact with the lower leg, can be used 24 hours per day, and do not “bottom out” after a period of time. Recent data have shown that the use of a heel protector device can decrease the incidence of PUs and allow healing of heel PUs in at-risk hospitalized patients.

Methods

This poster presents the findings of a prospective, controlled, non-randomized pilot study conducted at Wishard Health Center—a 353-bed general medical/surgical, level-one trauma facility that strives to advocate, care, teach, and serve.

- Staff from the operating room (OR), PACU, and same-day surgery ward were educated regarding the study procedures before the study began.
- Laboratory results and patient demographic characteristics were reported using descriptive statistics, which were tabulated using means, medians, standard deviations, and ranges for the continuous variables and frequencies and percentages for the categorical variables.
- To assess the change over time in Braden scores, changes were calculated as absolute changes (post – pre) and percentage changes (100 x [post – pre]/pre) from baseline to days 1 and 2.
- The research methodology and patient inclusion/exclusion criteria are shown in Figure 1.

Purpose

The purpose of this study was to determine whether a heel protector boot would prevent heel PUs both during and after an extended surgical procedure.

Results

A total of 13 patients (7 women, 6 men; mean age: 50.4 years) were studied. None of the patients developed heel PUs. There was a 37% median reduction in Braden scores from baseline to Day 1 and a 15% median reduction from baseline to Day 2.
Figure 1. Methodology and Inclusion/Exclusion Criteria

RESEARCH METHODOLOGY

1. The primary endpoint of this study is to reduce the incidence of heel pressure ulcer development in patients undergoing supine procedures anticipated to last a minimum of 3 hours from "cut to close.

2. All patients enrolled in this study will receive the heel-protector device 30 minutes prior to the procedure in the ambulatory surgery/holding area. The device will remain on the patient until they go into the OR while the patient is nonambulatory.

3. Preoperative skin assessment (data collection sheet, Scott Trigger Scale, Braden Scale, and NPUAP staging methodology) will be conducted and the results recorded at the initial application of the protector device. Immediately postoperatively, and on postoperative days 1 and 2, skin assessment will be conducted using a data collection sheet, Braden Scale, and NPUAP staging methodology. All data will be collected by the PI to ensure interrater reliability.

SUBJECT SELECTION

Inclusion Criteria

- All patients who are greater than 18 years of age
- All patients undergoing a supine procedure anticipated to last a minimum of 3 hours from "start to end"; the definition of start is at the timepoint of skin incision, and the definition of end is at the timepoint of final skin closure
- Patient must have no sign of heel pressure injury on preoperative skin assessment
- Patient must be scheduled for an inpatient hospital stay postoperatively
- Patient must be able to sign an Informed Consent Form for preventive treatment

Exclusion Criteria

- Any patient less than 18 years of age
- Any patient whose procedure does not last a minimum of 3 hours from "start to end"
- Any patient with signs or symptoms of a heel pressure injury on preoperative skin assessment
- Any patient not scheduled for an inpatient hospital stay postoperatively
- Any patient discharged before their 2nd postoperative day
- Any patient unable to sign an Informed Consent Form for preventive treatment
- Any patient noncompliant with the study requirements (i.e., not keeping the heel-protector device on at all times when non-ambulatory to prevent pressure on the heels or deemed uncooperative by research team).

None of the patients developed heel PUs

Clinical Implications

Acquiring an intraoperative PU may result in increased pain for the patient, increased hospital stays for the patient, disfigurement, and increased costs.16 Choosing to use an offloading device can prevent the occurrence of PUs in surgical patients. Preventing an iatrogenic PU will increase the comfort of the patient and allow the focus to be on healing rather than on the pain of a PU after surgery. In addition, the prevention of PUs will preclude the need for repeat trips to the OR for possible skin grafts. Use of an offloading device is one example that highlights the need for perioperative nurses to prevent adverse events if possible. Prevention of PUs reduces the risk of postoperative infections and thus decreases the costs associated with hospital stays.

References