Prevention of Heel Pressure Ulcers in Fractured Hip Patients
Columbus Regional Hospital, Columbus, Indiana

Discussion

Pressure ulcers of the heel are a devastating event for the fragile elderly who fracture their hip. This population is especially vulnerable due to age, malnutrition, and functional decline.

In spite of standard prevention practices including the use of pillows to elevate the heel off the bed, our fractured hip population (FHP) continued to suffer heel ulcers. We found the pillows were used inconsistently, usually the human element: patient and family moved them, the pillow was placed under the heel instead of suspending it, staff placed pillows in the chair for patient comfort, or during daily linen changes, the pillows were not replaced to suspend the heels.

By proactive use of the ventilated static air mattress (VSAM), all areas of the body were protected and pressure ulcers in the FHP went to zero (0). This is now standard practice on the orthopedic unit. The auditing of heel ulcers has become the standard by which new hospital replacement mattress (HMR) evaluation is measured. All new evaluation mattresses are trialed on the ortho unit with close follow up by the wound, ostomy, and continence nurse. Thus far, trial mattresses have not matched the performance of the VSAM in prevention of heel ulcers.

References:


**Prevention of Heel Pressure Ulcers in Fractured Hip Patients**

Lena McCubbin, RN, MS, CWOCN, CNS • Donna Smith, RN, UBCM • Kathy Jackson, RN, MSN, CRRN
Columbus Regional Hospital Columbus, Indiana

**Purpose/Rationale**
To examine whether a ventilated static air mattress (VSAM) could prevent nosocomial heel ulcers in the fractured hip population (FHP) if applied early in the hospital admission.

The authors hypothesize there would be a decrease in the incidence of post-fracture heel ulcers with the use of this VSAM.

**Method**
This was a quasi-experimental study with before/after design.

Convenience sampling of the entire fractured Hip Population on the Ortho Unit was obtained for one year before intervention and one year after intervention to compare rates of pressure ulcers.

**Pressure Ulcer Prevention for “Before” Group**

- Standard Care
  - Hospital replacement mattress (HRM) plus heel elevation with pillows.
  - Skin inspection each shift
  - Turning, repositioning and early mobilization.

**Pressure Ulcer Prevention for “After” Group**

- Static air mattress overlay* with ventilation holes was placed on the bed before patient reached unit from Emergency Department or within 8 hours of admission.
  - No boots or pillows were used to elevate the heels.
  - Skin inspection each shift.
  - Turning, repositioning and early mobilization.

**Implementation**

- RN Case Manager (CM) explained the importance of the static air mattress to shift and obtained education for shift on proper use of mattress overlay.
  - CM monitored:
    - All admissions and time frame in which the patient was placed on the overlay.
    - Condition of heels and other bony prominences at discharge.
    - The presence of overlay and time frame of implementation became a standard shift change report item.

**Results 2002 vs 2003**

<table>
<thead>
<tr>
<th></th>
<th>Sample size N=</th>
<th>Heel Ulcers</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before group (Stage II) 2002</td>
<td>72</td>
<td>4</td>
<td>5.6%</td>
</tr>
<tr>
<td>After group (Stage II) 2003</td>
<td>84</td>
<td>0</td>
<td>0.0%</td>
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</table>

No sacral ulcers were indentified in the after group.

**Why Does This Protocol Work?**

- Casual observation during and after the study suggests the ventilation holes may have some influence.
- The majority of the time, the heels are observed resting in the ventilation holes.
- Patients with Buck’s fraction are also observed with the heel in a hole.

**Does the holes matter?**

Static air mattress provides increased support area, and reduces shear and pressure - AHCFR No. 15 p. 38.

Static air produces “normal” or perpendicular force on the skin, reducing shear.

We used a flat bed sheet instead of a fitted sheet.

The loose flat sheet moves with the patient.

The sheet takes the friction, not the skin.

Less friction means less shear on the skin and underlying soft tissue.

**Pressure Ulcer Prevention for “Before” Group**

- Most were placed on the ventilated static air overlay upon admission.
- The 8 hour time frame was chosen based on how long the storeroom could re-supply it if the floor had no overlay. This alerts the nurse to intervene by a specific deadline.

**Prevention Interventions should be applied early in the hospital stay – Lyder, et al. Arch Intern Med 2001;141:1549-1554**

**Does the Timing Make it Work?**

After study was completed, a patient went from surgery to Intensive Care Unit (ICU) due to unstable vital signs (dropping blood pressure).

Patient was placed on prevention HRM. No air mattress was implemented. Patient received volume support, vasopressors, and blood transfusions.

Patient was transferred to the floor in 48 hours.

Four days post-op he was discovered to have large bilateral heel blisters.

The exact cause cannot be known: pressure vs. low blood flow or the combination of both.

**What About Finances?**

Should we routinely place patients on a prevention overlay?

84 patients were protected with a hospital material cost of approximately $3000.

Compare with:
- Cost of treating pressure ulcers
- Budget of treating pressure ulcers

**Financial Statement**

This study was supported by Columbus Regional Hospital as part of an ongoing Clinical Process and Quality Improvement Projects.

EHOB, Inc., provided poster and handout printing.

**Conclusion**

The results suggest that heel ulcers can be prevented in FHP using this protocol.

**References**

See handouts for references.