Epidural Anesthesia and Heel Damage: This study aimed at reducing heel damage in acute surgical patients prescribed epidural anesthesia and analgesia (EA). Patients suffering cardiovascular disease, multiple co morbidities, smoking and chronic pulmonary disease were found at increased risk of heel damage. Research findings may assist surgical risk assessment and outcomes for this patient cohort.

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1. Background

- Two patients prescribed epidural anesthesia/analgesia (EA) suffered heel damage requiring further surgery
- Heel protective devices are advised for this patient population, however current selection was by availability and/or proximity
- Sensory deficit increases risk of pressure damage 34 fold

2. Research Aims

- Compare heel condition with intrinsic (innate) factors
- Compare heel condition with extrinsic (external) factors
- Compare heel condition with the two heel protective devices available in all clinical areas
- Contribute to the evidence-base of a relatively neglected area of nursing practice
- Prevent heel damage

3. Method

- Heels protected intraoperative with polymer devices
- Changed in Post Anaesthetic Care Unit (PACU) to polymer only under left and inflatable under right heel
- 29 participants allowed 58 heel observations and followed for 24 hours
- Heel condition was the outcome measurement of this study
- Comparisons of intrinsic variables and heel condition included cardiac, vascular, pulmonary and metabolic
- Comparisons of extrinsic variables and heel condition included hours in operating room, heel protectors and anti-embolic stockings (TEDS)

4. Data Collection

Our aim was to prevent heel damage; hence a modified system of heel staging was used.

- Heel stage 0 = no sign/symptom of damage
- Heel stage 1 = blanching erythema (visual assessment)
- Heel stage 2 = non-blanching erythema present (visual assessment)
- Heel stage 3 = pain or altered tissue texture (tactile assessment)

5. Figure showing heel protectors found on wards and use in trial

LEFT HEEL **RIGHT HEEL**

Polymer device Inflatable device

Photos used with permission

6. Findings

- Heels are vulnerable to pressure in this patient population and found to be linked to both intrinsic and extrinsic factors

Intrinsic factors:

- Cardiovascular disease (OR=4.0) and multiple Comorbidity (OR=1.3) were associated with heel damage
- 100% of participants who smoked and suffered lung disease were found to have pain and altered heel texture without any colour change
- Age and body weight was not linked with heel damage (p=0.04). However, heel damage was significantly higher in females (62.5%,n=5) compared to males (37.5%,n=3)

Extrinsic factors:

- Heel damage was almost halved (25.8%,n=15) by recognising blanching erythema as an early sign of pressure and changing polymer to inflatable post surgery
- No damage was found when heels were protected by polymer intraoperatively and changed to inflatable device in PACU
- TEDS impacted heels. The majority of heel damage (87.5%,n=7) developed when TEDS were used continuously
- Heel damage occurred in as little as 2 hours intraoperatively

Unexpected finding:

- A higher prevalence of heel damage was found in patients ***without*** motor deficit (62.5%,n=5)

Limitations:

This study was limited by its small size. However, data generate may benefit future larger studies.

7. Conclusions & Recommendations

- Patients prescribed EA are at risk of heel damage
- Heel protection is required for the duration of epidural infusions
- Selection of heel protection according to manufacturer's recommendations both intra and postoperatively may assist in reducing heel damage formation in surgical patients
- Early and prompt response to blanching erythema may reduce the incidence of heel damage in this patient population
- Patients suffering cardiovascular disease, smoking, chronic pulmonary disease and multiple disease burdens may be at increased risk of heel damage in this postoperative cohort
- TEDS impact heels. Full removal more frequently than daily may reduce pressure damage
- Full mobility may not prevent heel damage when sensory deficit exists
- Inclusion of appropriate heel protection in epidural hospital policies may improve outcomes for this patient cohort

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REFERENCES

National Pressure Ulcer Advisory Panel (NPUAP). Pressure Ulcer Stages Revised by NPUAP. NPUAP, 2007 (available at: http://www. npuap.org/pr2.htm). Fisher, A., Wells, G., Harrison, M.B. (2004). Factors Associated with Pressure Ulcers in Adults in Acute Care Hospitals. *Holistic Nursing Practice*. 18(5): 242-254.Victorian Quality Council (VQC). Pressure Ulcer Basics (PUBS): education program 2006

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