In Australia about 60,000 people have at least one pressure ulcer (PU). Men (48%) have slightly fewer PU than women (52%) in prevalence studies. About 30% of PU patients are under 64 Y/O vs 70% over 64 Y/O.

In 2009 the National Pressure Ulcer Advisory Panel (NPUAP) & the European Pressure Ulcer Advisory Panel (EPUAP) published the Pressure Ulcer Prevention & Treatment Clinical Practice Guideline. Their Prevention and Treatment guidelines were based on Strength of Evidence assessments .

Under Etiology they note: “Pressure ulcers develop as a result of the internal response to external mechanical load.” Also noted is that the magnitude of mechanical load causing tissue damage is inversely related to the time it is applied. General prevention principles apply to the heel, but a specific section applies to heel support surfaces.

Heels must be free of the surface of the bed! Heel protection devices should elevate the heel by transferring all pressure to the calf and offering a way to spare the Achilles tendon. The Guidelines allow for the use of heel offloading products and pillows (prevention only) to float the heels to 0 mmHg pressure. They note that the most severe stage IV pressure ulcers are on the sacrum (39.9%) and heels (38.5%).

A separate study supporting the Guidelines recommendations is from McInerney et al: Proactive Assessment and Management of At-Risk Patients Reduces Pressure Ulcers and Saves $11 Million Annually in Two-Hospital System .

In 2002 NCH Healthcare System (550 bed two hospital system) had a hospital acquired prevalence of 12.8% (compared to a national rate of 8.5%) and the majority were located on the heels. A multifaceted pressure ulcer program that included a risk assessment of all adult patients (except obstetric and mental health) and wound care specialty consultations for those at high risk was instituted.

The admitting electronic medical record required an admission skin care assessment. Complete Braden scale risk assessments were automatically calculated, and repeated daily. High or very high risk patients (5.5%) were defined as a Braden score of 13, or were ventilator dependent or hemodialysis patients and automatically generated a consult with a WOCN.

Orders for high risk patients included turning every two hours, heel elevation, special intensive care lateral rotation beds, unit beds with foam mattresses, and Heelift Suspension boots. Orders for these special heel pressure elimination foam boots were automatically computer generated for ventilator and hemodialysis patients.

Results: The trend analysis from 2002 to 2007 that measured hospital acquired prevalence every six months found the prevalence of PU fell from 12.8% in January 2002 to 1.9% in January 2007. Heel pressure ulcer prevalence fell from 6.7% to 1.1% during that same time. In the USA, the costs for hospital acquired PU are no longer reimbursed. The NCH system conservatively estimates it saves $11.5 million USD annually.

This study and many others clearly demonstrate that active facility prevention is very effective in lowering HPU. Active prevention of HPU includes active administrative support, well designed nursing protocols, disciplined admission skin assessments, patient risk designations, nursing interventions, and effective heel offloading devices.
Treatment

The treatment of the HPU is directly dependent on the severity of the injury. A pressure ulcer is localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. The International NPUAP-EPUAP Pressure Ulcer Classification System includes four Categories/Stages.

**Category/Stage I**: Nonblanchable Erythema - intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching.

**Category/Stage II**: Partial Thickness Skin Loss - partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.

**Category/Stage III**: Full Thickness Skin Loss - Full thickness tissue loss. Subcutaneous fat may be visible but does not obscure the depth of tissue loss. May include undermining and tunneling.

**Category/Stage IV**: Full Thickness Tissue Loss - Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Undermining and tunneling are often included.

**Two subgroups:**

**Unstageable**: Depth Unknown - Full thickness tissue loss in which the base of the ulcer is covered by slough and/or eschar. The Category/Stage cannot be determined until enough slough/eschar is removed to show the base.

**Deep Tissue Injury**: Depth Unknown - Purple or maroon localized area of discolored intact skin or blood-filled blister caused by damage of underlying soft tissue from pressure and/or shear.

**Category/Stage I and II Heel Pressure Ulcers: Pressure/Shear Relief**

- Believes pressure under the heel by using pressure-reducing devices with heel suspension.
- Pressure Mapping Studies have shown that the posterior prominence of the heel sustains intense pressures even on bed pressure redistribution surfaces!
- Pillows are appropriate for short term use in alert and cooperative individuals.
- Heel suspension devices are preferable for long term use or with uncooperative patients. Beware of suspension devices that have metal bars that can cause injury to either leg.
- Once an ulcer develops, heel pressure relief is needed to promote perfusion.

**Category/Stage III and IV Unstageable Heel Pressure Ulcers: Pressure/Shear Relief**

- Elevate the heel in a device that completely offloads the PU.
- Elevation on a pillow is inadequate!
- Because of the time required to healing, a device completely offloading the ulcer area and preventing footdrop is preferred.
- The device should be removed frequently for skin checks and to avoid edema or device related pressure.

Think Achilles tendon!

Wound Bed Preparation:

**Cleansing:** For clean wounds, use saline or potable water. For PU with debris or bacterial colonization consider surfactants and/or antibacterial agents of low tissue toxicity. Cleansing the surrounding skin is useful. Hydrotherapy or wound irrigation between 4 to 15 g of pressure per square inch to loosen debris and slough with saline or irrigation solution is useful.

**Debridement:** Necrotic devitalized tissue is a nidus for infection, prolongs the inflammatory response, and impedes re-epithelialization. Thorough initial debridement should be followed by maintenance debridements. Select the method most appropriate to the wound and the patient’s condition. Sharp surgical debridement most rapidly converts a dirty chronic wound to an acute wound, and is necessary for septic necrotic ulcers.

- HPU with hard dry eschar: Do Not Debride.
- Slower methods may include the use of proteolytic or fibrinolytic enzymes and mechanical debridement with moist dressings.
- Some experts no longer recommend wet to dry dressings. Mechanical, autolytic, enzymatic, or biosurgical (maggot therapy) may be used when there is no urgent need for drainage or removal of necrotic tissue.

**Dressings:** Choose a dressing that keeps the wound bed moist, and the peripheral skin dry. For large HPU consider negative pressure wound therapy (NPWT) which must be used with an adequate pressure redistribution device.

**Infection:** For patients and wounds exhibiting signs of infection, use the biopsy method, or the Levine quantitative methods for culture and sensitivity. Superficial swab techniques are rarely useful.

- In a stage IV HPU exposing the os calcis, a bone biopsy, culture and sensitivities are indicated. Many experts consider bone exposure as presumptive evidence of osteomyelitis.

**Antibiotics:**

- Topical antibiotics for >10^5 CFU/g of tissue infections or bioburdens. Systemic antibiotics are indicated for patients with systemic infection or osteomyelitis.

**Surgery:**

- Consider skin grafts for a clean HPU.

**Non-Healing HPU:**

- Consider vascularity, anaerobic infection, osteomyelitis, better pressure, friction or shear control. Malnutrition extends the odds of healing by 2.6.

**The very best heel pressure ulcer treatment is always PREVENTION!**

**References**


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