Pressure Ulcers

Pat Mc Cluskey
Advanced Nurse Practitioner
Wound Care
Cork University Hospital Group
Overview

- Epidemiology
- Definition, Pathophysiology & Grades of Pressure Ulceration
- Definition, Pathophysiology of Moisture Associated Tissue Damage
- Medical Device Related Pressure Damage
- Risk Assessment & Risk Assessment Tools
- SSKIN Bundle

5/2/2017
Pressure Ulcer Prevalence

EPUAP (2002)

Pan European Prevalence Study
Sample Size = 5,000 pts
Standard Data collection tool
Prevalence Rate = 18%
Range 8.3% in Italy to 22.9% in Sweden

5/2/2017
Irish Prevalence Rates

- Moore & Pitman 2000
- Sheerin et al 2005
- Gallagher et al 2008
- Gethin et al, Mc Dermot - Scales et al 2009
- Moore & Cowman 2012

The mean prevalence is 16% (Moore et al 2013), varying from 4% (Mc Dermott- Scales 2009) to 37% (Sheerin et al 2005)
The problem

- Global mortality rates from 187 countries found a 32.5% increase in deaths directly attributable to pressure ulcers from 1990 - 2010
  (Lozano et al, 2010)

- In Ireland there have been six published studies which have explored pressure ulcer prevalence
Irish Incidence Rates

- Moore & Pitman 2000
- Sheerin et al 2005
- Gethin et al 2005
- Gallagher et al 2008
- O’Bien & Cowman 2011
- Moore et al 2011

**Mean incidence is 11% (Moore et al 2013) varying from 8% (Moore & Pitman 2000) to 14.4% (Gallagher et al 2008)**

5/2/2017
Definition

“A pressure ulcer is defined as a localised injury to the skin and / or the underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear”

(EPUAP/NPUAP/PPPIA 2014)

5/2/2017
Contributory factors

Both immobility and diminished activity are considered as primary risk factors

( Bergstrom *et al*, 1992)
Sites of Pressure Ulceration
Pathophysiology - PRESSURE

Pressure is a perpendicular load exerted on a unit of area.

$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$
SHEAR = mechanical stress

Shear is a mechanical force parallel, rather than perpendicular, to an area of tissue. In this illustration, gravity pulls the body down the incline of the bed. The skeleton and attached tissues move, but the skin remains stationary, held in place by friction between the skin and the bed linen. The skeleton and attached tissues actually slide within the skin, causing skin to pucker in the gluteal area.

The amount of pressure needed to produce occlusion with resultant ischemia is cut in half when sufficient shearing occurs.
Intensity and Duration of Pressure

Low intensity and long duration is as capable of producing tissue injury as high pressure for shorter duration.

5/2/2017
Prolonged pressure

Tissue Necrosis + Reperfusion Injury

- Fluid forced out of interstitial spaces causing cell to cell contact
- Cell membrane ruptures with release of toxic material
- Damage to lymphatic impedes removal of toxic substances = tissue necrosis

5/2/2017
Tolerance of Skin & Supporting Structures

- Influenced by Collagen content and auto-regulation mechanism of microcirculation.

- Collagen content of the dermis alters with disease, age, spinal cord injury & steroid use.
Physiology & Pressure Ulcer Healing

 ➢ **REGENERATION**

 Identical replication of cells in humans is possible in a limited number of cell types, e.g. epithelial, liver

 ➢ **REPAIR**

 Main mechanism by which healing occurs in humans whereby loss of tissue integrity is replaced by connective tissue. Important to remember in a Grade 1V Pressure Ulcer where there is muscle loss, this will be replaced by connective tissue & not muscle.
Grading of Pressure Ulcers

Ulceration is an observable alteration of intact skin whose indicators, when compared with an adjacent or opposite area on the body, may include changes in one or more of the following:

- **Skin Temperature** – warmth or coolness
- **Tissue Consistency** – firm or boggy.
- **And/or Sensation** – pain or itchy.
EPUAP Grading System

Grade 1

Grade 2

Grade 3

Grade 4

5/2/2017
Scottish Adapted European Pressure Ulcer Advisory Panel (EPUAP)
Grading Tool

Grade 1
Non-blanchable erythema (redness) of intact skin. Discolouration of the skin, warmth, oedema, induration or hardness may also be used as indicators, particularly on individuals with darker skin.

Grade 2
Partial thickness skin loss involving epidermis, dermis, or both. The ulcer is superficial and presents clinically as an abrasion or blister.

Grade 3
Full thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through underlying fascia.

Grade 4
Extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures with or without full thickness skin loss.

Progression of a pressure ulcer

Images: Colin Blain Medical Photographer Inverclyde Royal Hospital (IRH) Greenock / Science Photo Library

www.tissueviabilityonline.com/pu

Version 1 1st July 2009
Stage 1 Pressure Ulcer

Appears as a defined area of persistent redness (Non-Blanching) in lightly pigmented skin. Intact & usually presents over a bony prominence.

In darker skin tones, it may appear with persistent red, blue or purple hues.
Stage II Pressure Ulcer

Partial-thickness skin loss involving epidermis, dermis or both.

The ulcer is superficial and presents clinically as an abrasion, blister or shallow crater.

5/2/2017
Stage III Pressure Ulcer

Full-thickness skin loss involving damage to, or necrosis of, subcutaneous tissue that may extend down to, but not through, underlying fascia.

The ulcer may present clinically as a deep crater with or without undermining of adjacent tissue.
Stage IV Pressure Ulcer

Full-thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone or supporting structures (tendon, joint or capsule)

Undermining and sinus tracts also may be associated with stage 1V pressure ulcers

5/2/2017
Debate: 2 New Descriptors (EPUAP 2014)

Deep Tissue Damage

Unstageable
Sacral Pressure Ulcers
Kennedy Terminal Ulcer

- Pear shaped
- Associated with end of life
- Where all measures are in place for prevention of PU’s, yet PU’s occur

5/2/2017
Moisture Associated Lesions
Key risk factor: Incontinence

Type of incontinence:
- Faecal incontinence (diarrhoea/formed stool)
- Urinary incontinence
- Double incontinence (faecal and urinary)

Frequency of Incontinence:
- Frequent episodes of incontinence (especially faecal)
- Use of occlusive containment products
- Poor skin condition (e.g. due to aging/steroid use/diabetes)
Additional Risk Factors

- Compromised mobility
- Diminished cognitive awareness
- Inability to perform personal hygiene
- Pain
- Raised body temperature (pyrexia)
  - Medications (antibiotics, immunosuppressant)
  - Poor nutritional status
  - Critical illness
Prevention

- The presence of any urinary and/or faecal incontinence, even in the absence of other risk factors, should trigger implementation of an appropriate IAD prevention protocol to minimise/prevent exposure to urine and stool and protect skin.

- Assessment for IAD should be incorporated into a general skin assessment and performed as part of a pressure ulcer prevention/continence care programme.
Skin assessment of an at risk incontinent patient

Inspect skin:
- Perineum
- Perigenital areas
- Buttocks
- Gluteal fold, thighs
- Lower back
- Lower abdomen skin folds (groin, under large abdominal pannus, etc);

Inspect for:
- Maceration
- Erythema
- Lesions (e.g. vesicles, papules, pustules)
- Erosion or denudation
- Fungal or bacterial skin infection

Document findings & appropriate actions required in healthcare records
# Moisture Lesion vs Pressure Ulcer

<table>
<thead>
<tr>
<th></th>
<th>Moisture Lesion</th>
<th>Pressure Ulcer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td>Urinary and/or faecal incontinence</td>
<td>Exposure to pressure or shear</td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td>Pain, burning, itching, tingling</td>
<td>Pain</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Perineum, perigenital area; buttocks; gluteal fold; medial &amp; posterior aspects of upper thighs; lower back; may extend over bony prominence</td>
<td>Usually over a bony prominence or associated with location of a medical device</td>
</tr>
<tr>
<td><strong>Shape/edges</strong></td>
<td>Diffuse with poorly defined edges/may be blotchy</td>
<td>Distinct edges or margins</td>
</tr>
<tr>
<td><strong>Presentation /Depth</strong></td>
<td>Intact skin with erythema (blanchable/non-blanchable), with/without superficial, partial-thickness skin loss</td>
<td>Varies from intact skin with non-blanchable erythema to full-thickness skin loss. Base of wound may contain nonviable tissue</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>+/- Secondary superficial skin infection (e.g. candidiasis)</td>
<td>+/- Secondary soft tissue infection</td>
</tr>
</tbody>
</table>
Assessment

- Clinical observation and visual inspection.  
  *No bedside technologies aid the assessment and diagnosis of IAD*

- If the aetiology of erythema is *unclear*, implement a standard bundle of interventions for the management of both IAD and pressure ulcer prevention & assess for anticipated response

5/2/2017
Intervention

- **Manage** incontinence to identify and treat reversible causes (e.g. urinary tract infection, constipation, diuretics) to reduce, or ideally eliminate skin contact with urine and/or faeces.

- **Implement** a structured skin care regimen to protect the skin exposed to urine and/or faeces and help restore an effective skin barrier function.
Medical Device Related Pressure Ulcer

Definition:

A Medical Device Related (MDR) Pressure Ulcer is defined as a localized injury to the skin or underlying tissue as a result of sustained pressure from a medical device.

(NDNQI, 2016, Source ONMSD Wound Care Guidelines Draft January 2017)
Causes of MDR Pressure Ulcers

- Prolonged contact & Pressure
- Rigidity & inelasticity of device
- Difficulty adjusting/securing
- Wrong device size or selection
- Oedema
- Lack of awareness of skin care needs with devices in place
- Shear & friction
MDR PU

Patients at risk:

- Impaired sensory perception
- Impaired ability to communicate discomfort
- Compromised vascularity

34.5% of Hospital Acquired Pressure Ulcers occur in patient’s with medical devices (Black Cuddigan et al, 2010)

Patients with medical devices are **2.4 times** more likely to develop PU’s of any kind (White, 2005)
Who is at risk?
Structured approach to risk assessment
(NPUAP/EPUAP 2014)

Risk assessment is the first step in planning pressure ulcer prevention strategies.

... Prevention interventions may then be planned, implemented & evaluated

(Moore & Cowman 2014)

However...........

“A Pressure Ulcer risk assessment was conducted within 6 hours of admission/transfer to the unit/ward and was dated, timed and signed by the assessing staff member “...... METRICS

METRICS 5/2/2017
However....... No one tool has 100% Sensitivity & Specificity

- 9 x international prevalence studies - 48% of pt with existing PU, & 48% of HAPU were assessed as low/ no risk (Vangilder et al 2008)

- Irish study - 72% of pt with PU were deemed not at risk/ low risk (Braden). 10% had Grade 4. (Jordan O Brien & Moore 2004)

- Exploring the individual components of Braden scale showed that 68% of PU occurred in those that were bed/ chair fast & 64% occurred in those who were completely immobile limited mobility (Jordan O Brien & Moore 2004)

IMMOBILITY
CLINICAL JUDGEMENT ESSENTIAL
( Michael’s Story)
Influencing Risk

External
- Surfaces
- Tubing /aids/devices
- Staff ratio
- Staff knowledge
- Patient knowledge
- Care settings – activity
- Care packages

Intrinsic
- Perfusion & oxygenation
- Poor nutrition
- Increased skin moisture
- ↑Body Temp
- Advanced age
- Sensory perception
- Haematological measures
- General health status
- History P
- (NPUAP/EPUAP/PPPIA 2014)
Individualised Care Plan

Pressure ulcer prevention is based on the principle that prevention strategies are planned, based on the individual risk factors that the patient presents with.

( Moore 2004)
SSKIN Care Bundle

The skin care bundle is a powerful tool as it defines and ties best practices together. The bundle also highlights the process of preventing pressure ulcers in a manner visible to all. This helps minimise variation in practice.
SSKIN

Skin Inspection: Early inspection means early detection. Show patients and carers what to look for.

Keep your patients moving.

Incontinence/Moisture: Your patients need to be clean and dry.

Surface: Make sure your patients have the right support.

Nutrition/Hydration: Help patients have the right diet and plenty of fluids.

© NHS Midlands and East 2012
**SSKIN BUNDLE**

**Pressure Ulcer Prevention Care Plan**

**Commence when**

Waterlow Score ≥ 12

---

**Frequency of care delivery (circle as appropriate):**

<table>
<thead>
<tr>
<th>1hrly</th>
<th>2hrly</th>
<th>3hrly</th>
<th>4hrly</th>
</tr>
</thead>
</table>

**Date**

---

**Time:** (24 Hour Clock)

---

**SURFACE**

See advice re surfaces on LWHG Guideline on Pressure Ulcer Prevention on T Drive. Indicate each day if Foam or Pressure Relieving Mattress is in use.

---

**Mattress appropriate & functioning correctly.**

---

**Appropriate seating.**

---

**Heel protectors**

---

**SKIN INSPECTION**

Inspect skin at bony prominence every 2 – 4 hours. Existing Pressure Ulceration: Y/N (Circle). Stage & site of existing ulceration recorded in wound assessment chart Y/N (Circle).

---

**Pressure areas checked**

---

**New Redness Sites Site:**

---

**KEEP MOVING**

Frequency of repositioning is determined by skin inspection. If red at least 2 hourly.

---

**B**

R Side

---

**E**

L Side

---

**D**

Back

---

**CHAIR**

Standing / Mobilising

---

**INCONTINENCE**

Incontinence Related Skin Care regimen Implemented on T Drive, Tissue Viability Folder Y/N

---

**Dry and clean**

---

**Peri-anal skin healthy**

---

**NUTRITION**

Fluid Balance Chart / Food Chart in progress Y/N (circle and continue). Otherwise record below.

---

**Meal / snack taken**

---

**Drink taken**

---

**Supplements taken**

---

**Signature**

Grade: S/N - Staff Nurse
HCA - Health Care Assistant
OT - Occupational Therapist
D - Dietician
P - Physiotherapist
S - Student

---

**KEY:**

Care Delivered: J = YES  X = NO (if NO Document & Explain in Nursing notes)

**RED SKIN – RELIEVE PRESSURE – REVERSE DAMAGE**

Patient Pressure Ulcer Prevention Information booklet given

---

5/2/2017
Surface: Evidence on Support Surfaces for Pressure Ulcer Prevention

- People lying on ordinary foam mattresses more likely to get PUs than those lying on a higher-specification foam mattress.

- People who used sheepskin overlays on their mattress developed fewer PU.

- While alternating-pressure mattresses may be more cost effective than alternating-pressure overlays, merits of higher-specification constant low-pressure and alternating-pressure support surfaces for preventing pressure ulcers is unclear.

McInnes et al 2015
Cochrane Database of Systematic Reviews

5/2/2017
SKIN

- Skin turgor, oedema, dry & flaky, erythematous (red)
- Weight loss, skin folds (flaps), loss of muscle
- Weight gain
- Moisture capacity
- Temperature
- Colour

5/2/2017
Keep Moving

Repositioning

Rationale: Extended periods of lying or sitting on a particular part of the body and failure to redistribute the pressure on the body surface can result in sustained deformation of the soft tissues, ischaemia and tissue damage

- Use moving & handling aids to reduce friction & shear
- If hoist is used, remove the slings once transfer is complete, make sure they are well fitting
- Avoid lying on any tubes/medical devices
- If a PU already exists...the individual must not be directly on the PU, either lying or sitting
- Restrict sitting to 60 minutes 3 times daily if PU exists...balance with emotional/physical/lifestyle needs

5/2/2017
Heels

- Heel suspension devices to offload pressure (consider foot drop)
- Used according to manufacturers guidelines
- Pillows placed from knee to Achilles (back of ankle) with knee slightly flexed
- Assess the skin on heels each day by use of a hand held mirror if necessary
- Moisturise daily

5/2/2017
Incontinence/Moisture

- Clean & dry, pH balanced skin cleanser (4.0-7.0)
- Do not massage or rub the skin too vigorously (in the presence of inflammation +/- damaged blood vessels or fragile skin)
- Cleanse the skin properly after each episode of incontinence, To catheterise or not? Consider risks associated with medical devices
- Barrier creams for skin protection...increased moisture/humidity increases the risk of skin breakdown
- Self assessment & inspection routinely
- Avoid Sudocream

5/2/2017
Nutrition

What may be considered an adequate diet may actually be inadequate in the context of an underlying illness (Myers et al 1990)

NB

Adequate Hydration
Nutrition

- Inadequate nutritional intake & poor nutrition correlate with PU development, PU severity and protracted wound healing
- Dehydration a common but under acknowledged contribution to those at risk of PU development
- Inflammation/Infection can significantly increase the risk of malnutrition by increasing metabolism
- Weight & weight history, ability to eat independently, adequacy of total nutrient intake (30-35 kcalories/kg body weight if at risk or with a PU)
- Nutritional supplementation (Cubitan, Fortisip.. Multivitamins, Plenty fluids...)

5/2/2017
“Malnutrition, in this case under nutrition, can broadly be defined as a state of insufficient uptake of nutrients which can result in weight loss & has a measurable adverse effect on body composition, function and clinical outcome”

The use of the MUST Screening Tool
Avoidable Pressure Ulcer

Provider of the care did not do one of the following:

- Evaluate clinical condition & PU risk
- Plan & implement interventions consistent with patient needs & goals and recognised standards
- Monitor & evaluate the impact of interventions OR
- Revise the interventions as appropriate

5/2/2017
Scope of Practice

Document...Document...

Do no harm!!

5/2/2017