PRESSURE ULCERS AND INCONTINENCE-ASSOCIATED DERMATITIS (IAD)

ETIOLOGY AND PREVENTION

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European Pressure Ulcer Advisory Panel
Chair of the Scientific Committee
INTRODUCTION
INTRODUCTION
INTRODUCTION

29 year old woman after giving birth ...
INTRODUCTION
A NEW TERMINOLOGY AND A NEW DEFINITION?

- Pressure ulcer vs. Pressure *injury*
- A pressure injury is localized damage to the skin and underlying soft tissue usually over a bony prominence *or related to a medical or other device*.
- The injury can present as *intact skin or an open ulcer* and may be painful.
- The injury occurs as a result of *intense and/or prolonged* pressure or pressure in combination with shear.
- The *tolerance of soft tissue* for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities and condition of the soft tissue.

(National Pressure Ulcer Advisory Panel, 2016)
INTRODUCTION

A NEW TERMINOLOGY AND A NEW DEFINITION?

INTRODUCTION

- Heel: 30%
- Sacrum: 36%
- Hip: 6%
- Ischium: 6%
- Other: 7%
- Ankell: 7%
- Elbow: 9%
INTRODUCTION

- Mechanisms leading to tissue destruction
  - Reduced supply of oxygen in the tissue (leading to ischemia, including hypoxia, glucose depletion, and tissue acidification)
  - Muscle deformation

- Tissue destruction
  - Short period of high pressure/shear: tissue destruction
  - Continuous low pressure/shear: tissue destruction
INTRODUCTION
INTRODUCTION

- New insights?
  - Reperfusion injury
INTRODUCTION

- New insights?
INTRODUCTION

- New insights?
  - Microclimate
    - Temperature on the skin surface or tissue temperature
    - Air humidity or the humidity at the skin surface between the body and the support surface
    - Influence on the susceptibility of the skin/soft tissue for the effects of pressure, shear or friction forces
“Microclimate and its elements remain to be fully defined, and its relationship to pressure ulcer development clearly characterised. Evidence to date suggests that extremes of skin temperature and/or humidity/skin moisture appear to increase the sensitivity of skin to the damaging effects of pressure, shear stresses and friction”

INTRODUCTION

- New insights?
  - Impaired lymphatic drainage (accumulation of waste products)
  - Tissue deformation / direct cell deformation

The concepts involved in understanding pressure, shear, friction and microclimate and their synergistic actions in the formation of pressure ulcers are complex and not yet fully understood.
INTRODUCTION

• Friction does not cause pressure ulcers
NONE of these photographs is a pressure ulcer!
INTRODUCTION

Definition

- A reactive response of the skin to chronic exposure to urine and faecal material which could be observed as an inflammation and erythema with or without erosion or denudation

<table>
<thead>
<tr>
<th>Reference</th>
<th>N</th>
<th>Health Care Setting</th>
<th>Incontinence Type</th>
<th>Method of Measurement</th>
<th>Prevalence, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junkin and associates⁶</td>
<td>976</td>
<td>Acute care</td>
<td>Urinary and fecal incontinence</td>
<td>Direct observation</td>
<td>27</td>
</tr>
<tr>
<td>Bliss and associates⁴</td>
<td>10,215</td>
<td>Long-term care</td>
<td>Urinary and fecal incontinence</td>
<td>Review of electronic database</td>
<td>5.7</td>
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<tr>
<td>Defloor and associates⁵</td>
<td>19,964</td>
<td>Long-term care</td>
<td>Urinary and fecal incontinence</td>
<td>Direct observation</td>
<td>5.7</td>
</tr>
<tr>
<td>Arnold-Long and Reed¹⁰</td>
<td>171</td>
<td>Long-term acute care</td>
<td>Urinary and fecal incontinence</td>
<td>Direct observation</td>
<td>22.8</td>
</tr>
<tr>
<td>Beeckman and associates¹¹</td>
<td>141</td>
<td>Long-term care</td>
<td>Urinary and fecal incontinence</td>
<td>Direct observation</td>
<td>22.5</td>
</tr>
<tr>
<td>Junkin and Selekof⁷</td>
<td>608</td>
<td>Acute care</td>
<td>Urinary and fecal incontinence</td>
<td>Direct observation</td>
<td>20</td>
</tr>
</tbody>
</table>
TERMINOLOGY

- The terminology used in international literature to describe perineal skin breakdown caused by incontinence, is diverse.

- Terms that have been used for incontinence-associated dermatitis (IAD) are:
  - Diaper/napkin/nappy dermatitis
  - Diaper/napkin/nappy rash
  - Irritant dermatitis
  - Skin maceration
  - Moisture lesions
  - Incontinence lesions
  - Perineal dermatitis
  - Perineal rash
TERMINOLOGY

  - Diseases of the skin and subcutaneous tissue (Chapter XII, L00-L99) in subcategory ‘Dermatitis and eczema’ (L20-L30)
  - Contains codes for diaper dermatitis but does not contain separate codes for IAD

- IAD = part of a broader group of skin conditions, referred to as Moisture-Associated Skin Damage (MASD)

- US discussion: Incontinence associated skin damage (IASD) vs. Incontinence-Associated Dermatitis (IAD):
  - Most observations of this type of damage are not confirmed by a physician or nurse practitioner
  - Dermatitis = medical diagnosis and nurses are not allowed to chart it in the health record
## INTRODUCTION

### Size of the problem:
- Incidence

<table>
<thead>
<tr>
<th>Reference</th>
<th>N</th>
<th>Health Care Setting</th>
<th>Incontinence Type</th>
<th>Method of Measurement</th>
<th>Period of Observation</th>
<th>Incidence, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bliss and associates(^{19})</td>
<td>981</td>
<td>Long-term care</td>
<td>Urinary and fecal incontinence</td>
<td>Direct observation</td>
<td>6 weeks</td>
<td>3.4</td>
</tr>
<tr>
<td>Bliss and associates(^{12})</td>
<td>45</td>
<td>Critical care</td>
<td>Fecal incontinence</td>
<td>Direct observation</td>
<td>Duration of stay in the critical care unit: median time to onset of 4 d</td>
<td>36</td>
</tr>
<tr>
<td>Driver(^{8})</td>
<td></td>
<td>Critical care</td>
<td>Fecal incontinence</td>
<td>Direct observation</td>
<td>Phase 1: Duration of stay in critical care unit: &lt;14 d</td>
<td>Phase 1: 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Phase 2: Duration of stay in critical care unit: &gt;14 d</td>
<td>Phase 2: 19(^{a})</td>
</tr>
<tr>
<td>Arnold-Long and Reed(^{10})</td>
<td>132</td>
<td>Long-term care</td>
<td>Urinary and fecal incontinence</td>
<td>Direct observation</td>
<td>Duration of stay: Median time to onset 13.5 d</td>
<td>7.6</td>
</tr>
</tbody>
</table>

\(^{a}\)Researchers implemented defined skin care regimen, using 3-in-1 washcloth with skin cleanser, moisturizers, and dimethicone-based skin protectant during phase 2 of the study.
INTRODUCTION

Size of the problem:

- Survey (1911 caregivers)
  - 90.4% observed IAD in daily practice
  - Confusion about prevention
    - IAD is not a pressure ulcer (73.5%)
    - ... but should be prevented as a pressure ulcer (61.5%)
ETIOLOGY

- Incontinence: water is pulled into and held in the corneocytes
- Overhydration: swelling and disruption of the structure of the stratum corneum, and leads to visible changes in the skin
- Excessive hydration: irritants may more easily penetrate the stratum corneum to exacerbate inflammation
- Overhydrated skin: epidermis more prone to injury from friction
ETIOLOGY

- Exposure to urine and/or faeces: skin becomes more alkaline (skin bacteria convert the substance urea to ammonia which is alkaline)
- Increase in skin pH: micro-organisms to thrive and increase the risk of skin infection
- Faeces contain lipolytic (lipid-digesting) and proteolytic (protein-digesting) enzymes capable of damaging the stratum corneum
ETIOLOGY

- Skin barrier
RISK FACTORS

- Knowledge and awareness of risk factors is helpful to tailor IAD prevention and management

- IAD prevalence studies identified following key risk factors for IAD:
  
  - Incontinence: liquid stool is most irritating, followed by double incontinence, fecal incontinence and urine incontinence
  - Health status (critical illness, multimorbidity)
  - Fever
  - Diminished perfusion and oxygenation
  - Poor skin condition (e.g. steroid use/diabetes)
  - Restricted mobility and activity
  - Higher score on care dependency
  - Poor nutritional status
  - Risk of friction and shear
  - Restricted cognitive awareness
CLINICAL CHARACTERISTICS
CLINICAL CHARACTERISTICS
## CLINICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th>IAD</th>
<th>Pressure ulcer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cause</td>
<td>Moisture (+ friction)</td>
<td>Pressure/Shear</td>
</tr>
<tr>
<td>2. Location</td>
<td>Peri- anal (anal cleft)</td>
<td>Bony prominence</td>
</tr>
<tr>
<td>3. Shape</td>
<td>Diffuse - Kissing ulcer</td>
<td>1 spot</td>
</tr>
<tr>
<td>4. Depth</td>
<td>Superficial</td>
<td>Superfical - deep</td>
</tr>
<tr>
<td>5. Necrosis</td>
<td>-</td>
<td>Possible</td>
</tr>
<tr>
<td>6. Edges</td>
<td>Diffuse - irregular</td>
<td>Distinct edges</td>
</tr>
<tr>
<td>7. Colour</td>
<td>Redness is not equal</td>
<td>Redness is equal</td>
</tr>
</tbody>
</table>
DIAGNOSIS: SKIN INSPECTION

- **Observation**
  - **Bright red erythema** in persons with light skin tones, more subtle red in persons with darker skin tones
  - **Skin fold** or underneath diaper
  - Poorly demarcated and **irregular borders**
  - Surface of skin may **glisten** owing to serous exudates, hyperhydration or denudation
What in dark skin tones?

- Inflammation not readily apparent: often seen as areas of hyper-pigmentation or variable red tones
How to perform skin inspection?

Step 1: Separate and inspect skin folds
- Opposing skin surfaces trap and harbor moisture
- Inflammation most pronounced at deepest skin fold
DIAGNOSIS: SKIN INSPECTION

- How to perform skin inspection?
  - Step 1: Separate and inspect skin folds
    - Opposing skin surfaces trap and harbor moisture
    - Inflammation most pronounced at deepest skin fold
DIAGNOSIS: SKIN INSPECTION

- How to perform skin inspection?
  - Step 2: Assess for skin erosion
    - May present initially as “islands of partial thickness erosion”
    - Multiple areas of erosion closely spaced
    - Entire dermis may be eroded in severe cases
DIAGNOSIS: SKIN INSPECTION

- How to perform skin inspection?
  - Step 2: Assess for skin erosion
How to perform skin inspection?

Step 3: Inspect for secondary infection (such as Candida)

- Thrives in warm, moist environment and damages stratum corneum
- Prevalence of 18% in 976 acute care inpatients (Junkin & Selekoef 2006)
DIAGNOSIS: SKIN INSPECTION

- How to perform skin inspection?
  - Step 3: Inspect for secondary infection (such as Candida)
IAD ASSESSMENT

- Existing tools are time-consuming and linguistic complex for use in routine clinical practice in nursing homes
- A simple classification tool, supported by photographs illustrating the severity categories is needed
- Development of the IAD Severity Categorisation Tool:
  - To enhance correct identification and classification of IAD
  - To standardize record keeping
  - To provide a common description of IAD severity for the purpose of clinical practice, audit and research
# IAD ASSESSMENT

- **IAD Severity Categorisation Tool:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Clinical presentation</th>
<th>Definition</th>
<th>Wound related criteria**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 0</td>
<td></td>
<td>No redness and skin intact</td>
<td>Skin is normal as compared to rest of the body (no signs of IAD)</td>
</tr>
<tr>
<td>Category 1</td>
<td></td>
<td>Red* but skin intact</td>
<td>Erythema +/- oedema</td>
</tr>
<tr>
<td>Category 2</td>
<td></td>
<td>Red* with skin breakdown</td>
<td>As above for Category 1 +/- vesicles/bullae/skin erosion +/- denudation of skin +/- skin infection</td>
</tr>
</tbody>
</table>

* Or paler, darker, purple, dark red or yellow in patients with darker skin tones.

** If the patient is not incontinent, the condition is not IAD.
The aim of this systematic review and meta-analysis was to identify the associations between IAD, moisture and incontinence as its most important etiologic factors, and pressure ulcer development. The following research questions were addressed:

1. What is the association between IAD and pressure ulcer development?
2. What is the association between incontinence and pressure ulcer development?
3. What is the association between moisture and pressure ulcer development?
A Systematic Review and Meta-Analysis of Incontinence-Associated Dermatitis, Incontinence, and Moisture as Risk Factors for Pressure Ulcer Development

Dimitri Beeckman, Aurélie Van Lancker, Ann Van Hecke, Sofie Verhaeghe

Abstract: The aim of this analysis was to identify the association between incontinence-associated dermatitis (IAD), its most important etiologic factors (incontinence and moisture), and pressure ulcers (PUs). A systematic review and meta-analysis were performed. We searched Medline, Embase, CINAHL, Web of Science, and the Cochrane Library for relevant papers dating through March 15, 2013. Fifty-eight studies were included. Measures of relative effect at the univariate level were meta-analyzed. In most studies (86%), a significant association between variables of interest was found, with pooled odds ratios of PUs in univariate models between 1.92 (95% CI 1.54–2.38) for urinary incontinence and 4.99 (95% CI 2.62–9.50) for double incontinence (p < .05). This evidence indicates an association between IAD, its most important etiologic factors, and PUs. Methodological issues should be considered when interpreting the results of this review.

Keywords: pressure ulcer; decubitus ulcer; skin integrity; incontinence-associated dermatitis; incontinence; systematic review; meta-analysis

Research in Nursing & Health, 2014, 9999, 1–18
Accepted 21 February 2014
DOI: 10.1002/nur.21593
Published online in Wiley Online Library (wileyonlinelibrary.com).
IAD VS. PRESSURE ULCERS

Data sources
- Five databases (Medline, Embase, CINAHL, Web of Science, and the Cochrane Library)
- Conference proceedings
- End of study inclusion: March 15, 2013

Study Selection
- Original studies with a quantitative design
- Persons aged 18 years and older
- Reporting an association between incontinence-associated dermatitis, incontinence or moisture, and the development of PUs.
IAD VS. PRESSURE ULCERS

Data Extraction and Synthesis

- Quality was assessed using the Quality Assessment Tool for Quantitative Studies
- Data from included studies were extracted and tabulated using a standardized evidence table
- A quality assurance check was independently performed on 10% of the included studies.
IAD VS. PRESSURE ULCERS

Results

- Fifty-eight studies were included
- Measures of relative effect at the univariate level were meta-analyzed
- In most studies (86%), a significant association between variables of interest was found, with pooled odds ratios in univariate models varied between 1.92 (95% CI 1.54-2.38) for urinary incontinence and 4.99 (95%CI 2.62-9.50) for double incontinence (p<0.05)
Conclusion

- Despite the methodological variation in available studies and the heterogeneity of their results, our analysis indicates a likely association between IAD, its most important etiological factors, and the development of pressure ulcers.

- Well-designed cohort studies are needed to determine a causal relationship between the variables.
Prevention and treatment of incontinence-associated dermatitis: literature review

Dimitri Beeckman, Lisette Schoonhoven, Sofie Verhaeghe, Alexander Heyneman & Tom Defloor

Incontinence-Associated Dermatitis: A Comprehensive Review and Update

Mikel Gray, Dimitri Beeckman, Donna Z. Bliss, Mandy Fader, Susan Logan, Joan Junkin, JoanSelekof, Dorothy Doughty

Incontinence-Associated Dermatitis
Consensus Statements, Evidence-Based Guidelines for Prevention and Treatment, and Current Challenges

Dorothy Doughty, Joan Junkin, Peter Kurz, Joan Selelkoft, Mikel Gray, Mandy Fader, Donna Z. Bliss, Dimitri Beeckman, Susan Logan
PREVENTION

BEST PRACTICE PRINCIPLES

INCONTINENCE-ASSOCIATED DERMATITIS:
MOVING PREVENTION FORWARD

Addressing evidence gaps for best practice

Identifying causes and risk factors for IAD
IAD and pressure ulceration
IAD assessment and severity-based categorisation
IAD prevention and management strategies

Proceedings from the Global IAD Expert Panel
Interventions for preventing and treating incontinence-associated dermatitis in adults (Protocol)

Prevention of IAD must include a consistent and well-defined skin care regimen, including:

- Gentle perineal cleansing
- Moisturization
- The application of a skin protectant or moisture barrier

The use of absorptive or containment products and/or indwelling devices, **might be needed in specific situations to support prevention of IAD**.
PREVENTION

- The use of absorptive or containment products and/or indwelling devices, **might be needed in specific situations to support prevention of IAD**
PREVENTION

- **Gentle perineal cleansing**
  - Should involve a product whose pH range reflects the acid mantle of healthy skin (pH between 5.4-5.9)
  - The pH of normal soap is alkaline and in the range of 9.5-11.0
  - Increase of stratum corneum swelling
  - Alteration in lipid rigidity
  - Many no-rinse skin cleansers are “pH balanced” in order to ensure that their pH is closer to that of healthy skin.
PREVENTION

- Gentle perineal cleansing
Gentle perineal cleansing
- Gentle cleansing is preferred over scrubbing techniques and a soft cloth is recommended to minimize friction damage.
- Drying the skin by patting with a towel offered no advantage to conventional gentle rubbing as it leaves the skin significantly wetter and at greater risk of frictional damage.
- As soon as possible to limit contact with urine and stool.
- It is particularly important to provide timely cleansing following an episode of fecal incontinence.
PREVENTION

- Gentle perineal cleansing
  - Minimize friction damage
  - Drying the skin by patting with a towel offered no advantage to conventional gentle rubbing as it leaves the skin significantly wetter and at greater risk of frictional damage
  - As soon as possible to limit contact with urine and stool
  - Fecal incontinence!
PREVENTION

- **Moisturization / skin conditioning**
  - Barrier function = intercellular lipids + intact keratinocytes
  - Loss of water at the stratum corneum (TEWL)
  - Moisturization / skin conditioning involves repairing the skin barrier
  - Moisturizers contain varying combinations of emollients, occlusives, and humectants
  - The routine use of moisturizers is useful in replacing intercellular lipids and maintaining the barrier function of the skin
PREVENTION

- **Skin protecting**
  - To primarily prevent skin breakdown due to moisture and biological irritants in urine and faeces
  - A wide variety of products and formulas with both moisturizing and/or protecting/barrier capability.
  - *Must allow skin observation!*
PREVENTION

- Skin protecting
  - Commercially available skin protectants vary in their ability to protect the skin from irritants, prevent maceration, and maintain skin health:
    - **Petrolatum**: protection against irritants and maceration and provided some skin hydration
    - **Dimethicone**: varied in protection against irritants and have good skin hydration potential and low barrier efficacy
    - **Zinc oxide-based products**: Good protection against irritants but poor skin hydration to prevent maceration
    - **Acrylate terpolymer based products**: Protection against irritants but no skin hydration
TREATMENT

- Treatment of IAD must include a consistent and well defined skin care regimen, including:
  - Gentle perineal cleansing
  - Moisturization
  - The application of a skin protectant or moisture barrier

- The use of absorptive or containment products and/or indwelling devices, might be needed in specific situations to support treatment of IAD
TREATMENT

- The addition of antifungal products, steroidal based topical anti-inflammatory products, and topical antibiotics to treat IAD is only recommended in specific situations.
- Referral to a continence specialist if needed!
- Patients who do not respond to treatment within two weeks should be referred for additional evaluation.
SUMMARY

Moisture

Incontinence Management
- Ureum/ammonium pH
- Bacterial load
- Enzym. activity pH
- Bacterial load
- Enzym. activity Ureum/ammonium pH
- Bacterial load

Moisturizing Protecting
- Weakened skin
- Friction

Gentle perineal cleansing
- Chemical irritation
- Physical irritation

Bacterial growth
Cutaneous infections

HEALTHY SKIN
CONCLUSION

- Incontinence = risk factor for pressure ulcers, but IAD can occur in the absence of any other pressure ulcer-associated risk factors and vice versa.
- 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.
- Skin care should be an essential element in each pressure ulcer prevention protocol.
REFERENCES


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