Incontinence Skin Care

James B. Lutz, Clinical Research Specialist, 3M Health Care, St. Paul, Minnesota

Introduction

Maintenance of healthy, intact perineal skin is a constant challenge to the practitioner caring for the incontinent patient. It has been estimated that approximately 50% of the nearly 1.5 million nursing home patients in America are affected by urinary or fecal incontinence. In 1996, Hu reported that the annual economic impact of urinary incontinence was $6.4 billion. This does not even take into account intangible costs such as pain and suffering. Hu further estimated that 2.3% of this total amount (about $380 million) was spent on incontinence skin care.

Incontinence is associated with considerable morbidity as it predisposes individuals to perineal rashes, pressure sores, indwelling catheters, urinary tract infections, and urosepsis. Incontinence also has a considerable psychological impact on both the patient and caregiver. To the patient it represents considerable embarrassment and frequently leads to self isolation and depression. To the caregiver it can impart a sense of hopelessness and frustration.

Despite its considerable economic, physical and psychological impact, incontinence is still a largely neglected problem. Treatment traditionally emphasizes the use of absorbent products such as diapers. Long term use of diapers, however, frequently results in dermatitis in what would otherwise be healthy skin. The etiology of incontinence dermatitis is complex and results from an interacting cascade of events involving attack of the skin by physical, chemical, enzymatic and microbial factors.

Etiology of Incontinence Dermatitis

As illustrated in figure 1, the etiology of incontinence dermatitis is not just one single event which leads to skin breakdown, but rather a complex cascade of interacting events which weaken the skin and put it at risk for further breakdown. Moisture, physical irritants, chemical irritants, fecal enzymes, pH and microbial infections all play a roll in this downward cycle of events.

Moisture

Excessive skin moisture from urine, sweat and frequent washings increases the skin's coefficient of friction. An increase in the coefficient of friction causes the skin to become susceptible to rubbing and chafing against diapers, clothing and bed linens. Furthermore, excessive skin moisture causes the skin to become more permeable to chemical irritants and provides an excellent medium for microbial growth.

Physical & Chemical Irritants

Frequent washings can also be a significant source of physical and chemical irritation to the skin. This is particularly true when the skin has been previously hydrated by moisture. As previously discussed, moisture increases the skin's vulnerability to mechanical forces, making even the most gentle washing techniques a significant source of irritation. Also, moist skin is more permeable to chemical irritants contained in some soaps and cleansers.

Skin cleansers all contain surfactants which are used to lower skin surface tension, making it easier to loosen and wash away contaminants. True soaps (sodium salts of fatty acids) and alkyl sulfates tend to be harsh to the skin, especially as the fatty acid component of the molecule approaches a chain length of 12 (coconut acid). Bar soaps are typically made from 80/20 mixtures of sodium tallowate and sodium cocoate. As illustrated in figure 2, bar soaps can be very irritating, even to healthy intact skin. Use of bar soaps on the skin of at risk patients should therefore be avoided.

Liquid cleansers are often gentler than bar soaps, provided they are formulated with gentle surfactants. Unfortunately, not all liquid cleansers are formulated with gentle surfactants. Sodium Lauryl Sulfate (SLS), for example, is a harsh alkyl sulfate surfactant often used in liquid cleansers because it is relatively inexpensive and stable in most formulations. However, as illustrated in figure 2, SLS can be even more irritating to the skin than bar soaps. When in doubt, read the label for ingredients and/or request appropriate safety information from the product manufacturer demonstrating suitability for use on at risk skin.
Figure 2: Results of a standard Human 21-Day Cumulative Irritation Potential Patch Test on 27 healthy adult volunteers.16

<table>
<thead>
<tr>
<th>Test Code</th>
<th>Description</th>
<th>Surfactant</th>
<th>Surfactant Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Sodium Lauryl Sulfate 0.1% aqueous solution</td>
<td>Sodium Lauryl Sulfate</td>
<td>Alkyl Sulfate</td>
</tr>
<tr>
<td>B</td>
<td>Sween® Peri-Wash II® (undiluted)</td>
<td>Unknown - Ingredients not listed</td>
<td>Unknown</td>
</tr>
<tr>
<td>C</td>
<td>Safeguard® Bar Soap (1% aqueous suspension)</td>
<td>Sodium Tallowate, Sodium Cocoate, Sodium Palamate</td>
<td>Soap</td>
</tr>
<tr>
<td>D</td>
<td>Dial® Bar Soap (1% aqueous suspension)</td>
<td>Sodium Tallowate, Sodium Cocoate, Sodium Palamate</td>
<td>Soap</td>
</tr>
<tr>
<td>E</td>
<td>Ivory® Bar Soap (1% aqueous suspension)</td>
<td>Unknown - Ingredients not listed</td>
<td>Soap</td>
</tr>
<tr>
<td>F</td>
<td>3M™ One-Step Skin Care Lotion (undiluted)</td>
<td>Glyceryl Stearate</td>
<td>Glyceryl Ester</td>
</tr>
<tr>
<td>G</td>
<td>3M™ Antiseptic Skin Cleaner (undiluted)</td>
<td>Poloxamer 188</td>
<td>Polymeric Ether</td>
</tr>
<tr>
<td>H</td>
<td>Distilled Water</td>
<td>None</td>
<td>NA</td>
</tr>
</tbody>
</table>

Stool, Enzymes & pH

Stool is also a significant source of irritation to the skin. Stool contains both proteolytic and lypolytic enzymes which are used in normal digestion processes.4,7 These enzymes are normally deactivated as the stool passes through the GI tract by adjustment of the feces to a near neutral pH of 7.15.17 When urine and stool mix, however, bacteria in the stool convert urea in the urine to ammonia.7 The level of ammonia found in the normal diaper environment is not, of and by itself, caustic to the skin.18 However, ammonia causes a dramatic shift in the pH of both the skin and the stool well into the alkaline range.5 This pH shift reactivates the digestive enzymes found in the stool and they attack the skin.4,7,19

Skin which is at a higher pH is also much more permeable to chemical irritants.20 This combined with the increased permeability caused by hydration, makes the skin of the incontinent patient very susceptible to enzymatic, chemical and physical irritation.

Finally, elevation of skin pH by ammonia and alkaline bar soaps strips away the protective acid mantle of the skin. The acid mantle is a defense mechanism of the skin to help keep microbial growth in check. When the skin is hydrated from urine, sweat and frequent washings, and when the protective acid mantle has been compromised, the skin becomes vulnerable to bacteria, yeast and fungus infections.

The Cycle of Events

As illustrated by figure 1, skin which is weakened by the insults of moisture, mechanical injury and chemical/ enzymatic irritants becomes vulnerable to further breakdown. This becomes a viscous feedback cycle which ultimately leads to incontinence dermatitis. If the patient's condition is further compromised by pressure, poor nutrition or disease, further breakdown is likely. It has been estimated that the cost of treating the average dermal ulcer is between $5,000 and $10,000.21,22 Therefore, on a monetary basis alone, it is clearly more advantageous to invest a few extra cents in proper skin care than it is to treat the resulting breakdown. This argument does not even take into account "quality of life" issues which are of primary importance.

Putting it together - An Evidence Based Incontinence Skin Care Program

3M Antiseptic Skin Cleanser & 3M One-Step Cleansing Lotion

3M Antiseptic Skin Cleanser and 3M One-Step Skin Care Lotion are both formulated with gentle surfactants to help loosen and remove contaminants from the skin. The rationale for choosing gentle skin cleansers for use on at risk patients has been previously discussed and is illustrated in figure 2. 3M One-Step Skin Care Lotion is additionally formulated with dimethicone, an active (OTC drug) ingredient which forms a temporary breathable moisture barrier on the skin (figure 4).

Gentle, no rinse skin cleansers have been shown to be a cost-effective alternative to traditional soap and water cleansing when nursing time and skin condition are taken into account (figure 3). In a study presented in 1996, Plante and Regan measured the amount of time it took for four nursing assistants to conduct 32 bed bath procedures, 16 using the traditional soap and water method and 16 using the no-rinse cleanser method.23 They found that the no-rinse cleanser method saved an average of 13 minutes per bed bath procedure compared to the traditional soap and water procedure. Using a nursing assistant salary figure of $5.35 per hour, they concluded that the no-rinse cleanser procedure saved an average of $1.16 in nursing time per patient bed bath. They further estimated that the average nursing assistant conducts 8 bed baths per day.

In another study,24 the same authors demonstrated that when a gentle no-rinse skin cleanser was incorporated into an overall caregiver education program on the care of at risk skin, the incidence of skin tears in a 125-bed long term care facility decreased by 78%. This resulted in an additional savings of $752.64 per week in treatment costs (dressings + nursing time) associated with these skin tears. The authors point out that a key variable in reducing the incidence of skin tears is the selection of a gentle ("non-detergent") skin cleanser.
**3M Cavilon™ Durable Barrier Cream**

The AHCPGR guidelines concerning skin at risk for pressure ulcer development recommends the use of skin moisturizers to treat dry, fragile skin. The guideline points to research which suggests a link between dry, flaky, or scaling skin and an increased incidence of pressure ulcer development. The guidelines also suggest “that adequate hydration of the stratum corneum helps to protect against mechanical insult.” Furthermore, the guidelines recommend that “at risk” skin be protected from “exposure to moisture due to incontinence, perspiration, or wound drainage” and that “topical agents that act as barriers to moisture” should be considered.

3M Cavilon™ Durable Barrier Cream is a concentrated skin moisturizer formulated with dimethicone, an active (OTC drug) ingredient which forms a temporary breathable moisture barrier on the skin. The product also contains a patented polymer that helps the moisture barrier resist soap and water wash off (figure 5). Resistance to soap and water wash-off is an important economic and performance factor in selecting moisture barriers. For economic reasons, a long lasting, wash-off resistant moisturizer/barrier needs to be applied less often, saving both materials and labor costs. For performance reasons, a long lasting, wash-off resistant barrier helps to ensure therapeutic levels of protection between washes, even if the caregiver can not reapply.

**3M No Sting Barrier Film**

3M No Sting Barrier Film is a cost-effective alternative to traditional petrolatum and zinc oxide ointments on both intact and non-exuding denuded skin. Since the film does not wash off the skin like traditional ointments, reapplication is much less frequent. In fact, clinical studies show that No Sting Barrier Film can provide up to 72 continuous hours of protection (figure 6). This is particularly beneficial on challenging patients with frequent incontinent episodes and/or with home care patients that may not have access to continuous nursing care.

**Figure 6 & 7: Results of an Incontinence Skin Protectant Cost Effectiveness Study**

**Figure 4: Results of a moisture Barrier Study**

**Figure 5: Results of a moisture barrier wash-off study**
Incontinence Skin Care Algorithm

Infection?
  Yes → Consult Wound Care Nurse or Physician
  No → Intact Skin?
    Yes
      No Irritation to
      Moderate Irritation
        Severe
        Irritation
      Incontinence Frequency?
        1-3 X
          Daily
        >3 X
          Daily
      Protocol #1
        3M One-Step prn + 3M DBC q.25 hr.
      Protocol #2
        3M One-Step prn + 3M DBC q.8 hr.
    Incontinence Frequency?
      1-3 X
        Daily
      4-6 X
        Daily
      >6 X
        Daily
      Protocol #3
        3M ASC prn + 3M NSBF q.72 hr.
      Protocol #4
        3M ASC prn + 3M NSBF q.48 hr.
    Incontinence Frequency?
      Protocol #5
        3M ASC prn + 3M NSBF q.24 hr.
      Complications or Questions
    Drainage?
      None
      Mildly Draining
        Protocol #6
          3M ASC prn + 3M NSBF +
          3M Tegaderm or 3M Tegasonb THIN
      Moderately Draining
        Protocol #7
          3M ASC prn + 3M NSBF +
          3M Tegaderm or 3M Tegasonb
      Heavily Draining
        Protocol #8
          3M ASC prn + 3M NSBF +
          3M Tegasonb or
          3M Tegagen w/ Cover Dressing
    Consult Wound Care Nurse or Physician

Infection or
Any Other Condition
Incontinence Skin Care Protocols

Protocol #1 & #2: Prevention

Step #1: Cleanse skin after each incontinent episode with 3M One-Step Skin Care Lotion. Gently spray area with One-Step Skin Care Lotion as required. Remove debris with a clean cloth or gauze pad that has been moistened with One-Step Skin Care Lotion and/or water. Repeat as necessary until clean up is complete. Rinsing of the skin is not necessary.

Step #2: For added protection, apply 3M Cavilon Durable Barrier Cream sparingly to cover the entire affected area. Repeat as necessary, every 8 to 24 hours depending on cleansing frequency.

Protocols #3 - #5: Treatment

Step #1: Cleanse skin after each incontinent episode with 3M Antiseptic Skin Cleanser. Gently spray area with Antiseptic Skin Cleanser as required. Remove debris with a clean cloth or gauze pad that has been moistened with Antiseptic Skin Cleanser and/or water. Repeat as necessary until clean up is complete. Rinsing of the skin is not necessary.

Step #2: Following package directions, apply a uniform coating of 3M No Sting Barrier Film to the entire area affected by the incontinence. Repeat as necessary, every 24 to 72 hours depending on cleansing frequency.

Protocols #6 - #8: Treatment + Ulcers

Step #1: With the dressing still in place, cleanse the skin after each incontinent episode with 3M Antiseptic Skin Cleanser. Gently spray area with Antiseptic Skin Cleanser as required. Remove debris with a clean cloth or gauze pad that has been moistened with Antiseptic Skin Cleanser and/or water. Repeat as necessary until clean up is complete. Rinsing of the skin is not necessary.

Step #2: Following package directions, apply a uniform coating of 3M No Sting Barrier Film to the entire area affected by the incontinence. Repeat as necessary, every 24 to 72 hours depending on cleansing frequency. For added protection of fragile peri-wound skin, apply No Sting Barrier Film up to the edge of the wound at each dressing change. Select a dressing appropriate for the wound. Consult with a wound care nurse or physician when necessary.