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## Perineal Dermatitis in Critical Care Patients

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# Perineal Dermatitis in Critical Care Patients

Donna S. Driver, RN, CS, CWCN

**P**erineal dermatitis is an inflammatory condition of the skin in the perineal area, upper part of the thigh, and buttocks that is commonly associated with incontinence. It is manifested by various degrees of skin injury, ranging from redness to areas of denuded skin. It may be asymptomatic or may be accompanied by itching or pain.<sup>1</sup>

Normal skin maintains its barrier function by means of an intact epithelium created by the individual skin cells. The normal pH of the skin

varies from person to person, but in the normal state, the skin is acidic with a mean pH of 5.5 to 5.9. Changes in the external pH of the skin affect the fatty acid content of the skin and impair the integrity of the barrier formed by the skin cells.<sup>2</sup>

The pH of normal urine varies from 5.5 to 6.5. With urinary incontinence, the skin is exposed to ammonia formed by the conversion of urea to ammonia, leading to an increase in local pH. Ammonia can have a pH of 11.0 or even greater, depending on the concentration and chemical form, so the greater the amount of ammonia in the urine, the higher is the pH of the urine. The combination of perspiration (mildly alkaline) with urine can increase the skin pH to 8.0 or greater<sup>2</sup> (see Figure).

Normal stool is also alkaline, with a typical pH of 7.0 to 7.5, contributing to an abnormal local skin pH in patients with incontinence. Overgrowth of microorganisms from the skin or stool, leading to skin irrita-

tion or infection, can further weaken the skin defense. Mechanical damage of the skin from friction and pressure can lead to erosions and pressure ulcers, particularly in skin that is already compromised by prolonged exposure to stool and urine.<sup>2</sup>

## Perineal Dermatitis Patient-Related Factors

Patient-related factors associated with perineal dermatitis include chronic exposure to moisture, fecal and urinary incontinence, an incontinence containment device, an alkaline pH of the skin, overgrowth or infection with microorganisms such as *Staphylococcus* and *Candida albicans*, and friction forces on the skin. Mechanical chafing, fecal and combined urinary-fecal incontinence, and the use of restraints are modifiable factors associated with increased risk for perineal dermatitis in patients in nursing homes.<sup>3</sup> Although an effort has been made to create a risk assessment tool for perineal dermatitis, reliability and validity studies on this tool are yet to be published.<sup>4</sup>

## Incontinence

Incontinence is a common problem in hospitalized patients. Up to half of the institutionalized elderly population is incontinent of stool.<sup>5</sup>



This article has been designated for CE credit. A closed-book, multiple-choice examination follows this article, which tests your knowledge of the following objectives:

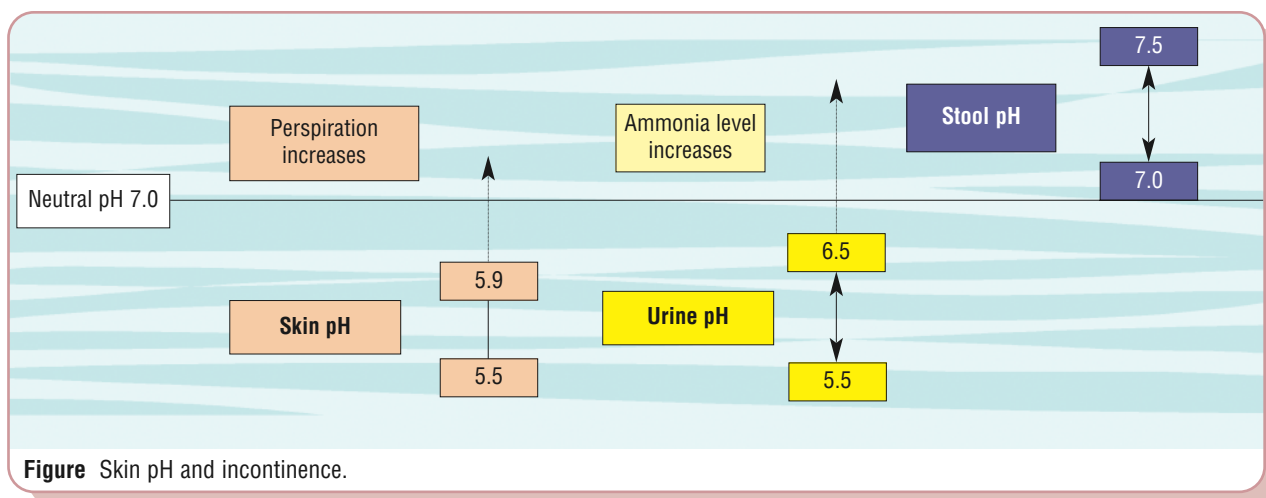
1. Identify factors associated with increased risk for development of perineal dermatitis
2. Describe the challenges of caring for hospitalized patients with urinary and fecal incontinence
3. Discuss considerations for improving application of recommended preventive measures for perineal dermatitis

## Author

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**Figure** Skin pH and incontinence.

Variable rates of 30%,<sup>6</sup> 41%,<sup>7</sup> and 50%<sup>1</sup> for urinary incontinence have been reported for patients in nursing homes. Incontinence is also common in the acute care setting, where 33% of patients are reported to have fecal incontinence.<sup>8</sup> The role of urinary incontinence in the acute care setting has been reported at 13.8%,<sup>9</sup> although this estimate may be low because the prevalence rate of urinary incontinence in the general population is reported to be up to 17%.<sup>10</sup>

The morbidity rate associated with fecal incontinence is high. Perineal dermatitis develops in a third of patients with fecal incontinence.<sup>4</sup> Perineal dermatitis not only can cause itching and pain but also increases the risk for urinary tract infection, microbial skin infection, and pressure ulcers.<sup>11</sup> In one study,<sup>12</sup> 56.7% of patients with pressure ulcers also had fecal incontinence, making fecal incontinence one of the most common associated risk factors for pressure ulcers.

The standard of care for hospitalized patients who are incontinent includes prevention of perineal dermatitis with regular skin care and application of skin protectants. Patients at risk for perineal dermati-

tis should have routine perineal skin care that includes gentle cleaning, use of moisturizers, and the application of a moisture barrier to the skin. The clinical practice guidelines of the Wound, Ostomy, and Continence Nurses Society<sup>13(p14)</sup> suggest keeping the skin clean and dry and applying an incontinence skin protectant after each episode of incontinence.

A cleanser specifically designed for perineal skin care is preferable to soap and water because soap is drying and increases the pH of the skin. Perineal skin cleansers typically include a surfactant and are pH balanced and are labeled for use as a perineal skin cleanser (eg, Aloe Vesta by ConvaTec, Princeton, New Jersey and Secura Personal Cleanser by Smith & Nephew, Largo, Florida). The use of skin protectants after cleaning is also important, because adding a protectant (a moisture barrier, such as zinc oxide) reduces the incidence of perineal dermatitis by half.<sup>3,14</sup> Preventive cleansing and application of a protectant reduce the incidence of pressure ulcers by as much as 59%.<sup>15</sup> Despite these benefits, the recommendations for prevention of perineal dermatitis are often overlooked, and skin protectants are

underused in hospitalized patients.<sup>7</sup> These circumstances prompted development of a project aimed at improving this aspect of care.

### Project Goals

The goals of this performance improvement project were to determine how often appropriate preventive measures (using an intervention protocol for hospitalized patients in the intensive care unit [ICU]) were being used and the rate of skin breakdown in patients with fecal incontinence who were managed by using the intervention protocol.

### Study Setting and Subjects

Patients were recruited for the intervention program from the ICU at Mary Washington Hospital, an acute care regional medical center in Fredricksburg, Virginia. The ICU is a 28-bed unit that handles postsurgical cardiac and neurosurgery patients as well as patients with problems such as sepsis or who require ventilatory support. The typical length of stay in the ICU for patients is 3 to 5 days.

All adult patients who were admitted to the ICU and who had no skin breakdown at the time of admission were included in the study. Patients

were excluded if they had known skin breakdown or if they had a history of multiple admissions to the ICU. The goal was a sample size of at least 100 patients for each of 2 treatment study arms.

## Methods

The ICU Performance Improvement Committee developed a simple data collection sheet to record daily variables that could affect skin integrity. For each variable, nurses were required to make a simple check mark on the data collection sheet if the variable was present. Information on the presence of fecal incontinence, the sequence of events when a skin protectant was applied, and the presence of skin breakdown was recorded. All patients had indwelling urinary bladder catheters in place and therefore were not incontinent of urine.

Skin breakdown was the primary end point and was defined as red, weepy, denuded skin. To keep data collection simple, the nurses noted if these findings were present, but were not required to measure the areas of denuded skin or estimate the depth. Data were collected by the nursing staff during the 11 PM to 7 AM shift daily and were tabulated later by a certified wound ostomy

and continence nurse. Nursing assessment and documentation from the nursing flow sheets were used for data collection.

The study was done in 2 phases, and each phase lasted 4 weeks. The first phase focused on the nurses' rates of use of a no-rinse cleanser and a zinc oxide barrier. After the results of the first phase were reviewed, the second phase of the study, with a different treatment protocol, was developed. In the second phase, a 1-step cleaning and protectant product was introduced for use by the nursing staff after an in-service education program on the use of the product. Data collection was continuous between the phases.

### Phase 1

In phase 1, the patients who were incontinent of stool were washed with a no-rinse cleanser (Secura Personal Cleanser) and then a zinc oxide barrier (Calmoseptine, Calmoseptine Inc, Huntington Beach, California) was applied. The personal cleanser was sprayed on a white disposable cloth and then the skin was wiped with the cloth. No rinsing was required. Additional cloths dampened with the personal cleanser were used as needed. The zinc oxide was wiped off during cleaning with

the personal cleanser, and more was applied with a gloved hand after the cleaning. Although the use of disposable cloths was encouraged, cloth cleaning materials were occasionally used. The cleanser and zinc oxide were placed at the bedside for ready use by nursing staff.

### Phase 2

In phase 2, the nursing staff was provided an in-service program on the proper use of a 1-step product, and the other skin care products were removed from the patients' rooms. For each patient, a washcloth impregnated with 3% dimethicone (Comfort Shield, Perineal Care Washcloths, Sage Products Inc, Cary, Illinois) was used to clean the patient and apply a protectant barrier at the same time. The nurses wiped the perineal area with the disposable cloths without rinsing or applying an additional barrier product. Additional cloths were used as needed.

## Results

### Phase 1

A total of 131 patients were enrolled in phase 1. Of these, 16 were incontinent of stool, and perineal dermatitis developed in 8 of the 16 (see Table). The length of stay was 14 days or less for 5 of the 8 patients

**Table** Results of the 2 phases of treatment

Result	No. (%) of patients	
	Phase 1	Phase 2
Total patients enrolled	131 (100)	177 (100)
Patients with fecal incontinence	16 (12)	16 (9)
Incontinent patients with skin breakdown	8/16 (50)	3/16 (19)
Incontinent patients with length of stay $\leq$ 14 days		
No skin breakdown	8 (50)	7 (44)
Skin breakdown	5 (31)	0 (0)
Incontinent patients with length of stay >14 days		
No skin breakdown	0 (0)	6 (38)
Skin breakdown	3 (19)	3 (19)

in whom perineal dermatitis developed. In the remaining 3 patients, perineal dermatitis developed after a length of stay greater than 14 days. Perineal dermatitis did not develop in any patients who were continent of stool.

Only 2 of the 8 incontinent patients were treated from the first episode of incontinence. Zinc oxide was used inconsistently in all 8 patients. Reasons cited for the inconsistent use were the difficulty of applying and removing the zinc oxide, even though complete removal of the zinc oxide during each cleansing is not necessary.<sup>16</sup>

### Phase 2

A total of 177 patients were enrolled in phase 2. Of these, 16 were incontinent of stool, and skin breakdown developed in 3 of the 16 (see Table). All 3 of the patients in whom perineal dermatitis or skin breakdown developed had a length of stay greater than 14 days.

The dimethicone cleaner/barrier product was applied from the first day of incontinence for all 16 patients and was consistently applied after each episode of incontinence throughout the ICU stay for each patient.

### Discussion

Perineal dermatitis or skin breakdown developed in 50% (8/16) of the incontinent patients treated with the phase 1 protocol compared with 19% (3/16) of the incontinent patients treated with the phase 2 protocol (see Table). Among patients with a length of stay of 14 days or less, the incidence of skin breakdown was 62% (5/8) in patients with fecal incontinence treated with the phase 1 protocol compared with 0% (0/7) in

patients treated with the phase 2 protocol. Skin breakdown occurred in all 3 of the incontinent patients treated with the phase 1 protocol who had a stay exceeding 14 days. All 3 patients in the phase 2 group who had skin breakdown had a length of stay of more than 14 days.

In this observational performance study, patients treated in phase 2 with a 1-step product had a lower rate of perineal skin breakdown regardless of length of stay than did patients managed with the 2-step procedure used in phase 1. This difference may be due to better compliance by staff with the 1-step treatment protocol than with the 2-step protocol. The improved compliance may have been due to the ease of use of a 1-step system or to the greater ease of applying dimethicone compared with zinc oxide. The in-service education program for the 1-step program may also have contributed to the increase in compliance with the intervention. In addition, nurses' performance might have improved over time because of increasing understanding of the need for intervention in patients' skin care as the study progressed. Alternatively, other, unidentified beneficial effects unique to the 1-step product could have contributed to the improved outcomes.

The small number of patients precluded full statistical analysis, and studies with larger groups may have different results. Another limitation was the exploratory nature (noncontrolled) of the study. In studies of performance improvement, products are not compared side by side or with a placebo; therefore, uncontrolled factors related to patients, such as patients' acuity or diagnosis, may have affected the results.

### Implications for Practice

Perineal dermatitis did not develop in all patients with fecal incontinence, even in the phase 1 patients who had inconsistent intervention. Factors known to contribute to perineal dermatitis include patients' age, sex, primary diagnosis, comorbid conditions, illness acuity, mobility, motor or sensory deficits, medication, fluid status, and nutritional status. Future studies to determine the contribution of each of these would be helpful in determining which patients benefit most from intervention.

Compliance with a treatment protocol is of primary importance in whether an intervention will be effective. In this study, the compliance with treatment improved with the use of a 1-step product after an in-service training session. Ease of use as well as efficacy should be considered when choosing a preventive measure for perineal dermatitis. The nursing staff at all levels of patient care should be involved in the choice of a preventive measure. Such involvement may allow earlier detection of barriers to consistent use of a given product. In addition, ongoing education may improve compliance with prevention measures.

### Conclusion

Caring for patients with fecal incontinence is a challenge for any nurse. When caring for patients with multisystem organ failure, ICU nurses may not consider the skin a vital organ to be addressed until after skin breakdown has occurred. Defining specific obstacles in the consistent application of interventions may lead to improved approaches to patients' care and improved outcomes for patients.

Despite the limitations of this performance study, outcomes improved for patients who were consistently treated with a 1-step product that both cleans and protects the skin. These preliminary results are promising and warrant further studies to verify the findings.

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#### Financial Disclosures

None reported.

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**CE Test** Test ID C0743: Perineal Dermatitis in Critical Care Patients

**Learning objectives:** 1. Identify factors associated with increased risk for development of perineal dermatitis 2. Describe the challenges of caring for hospitalized patients with urinary and fecal incontinence 3. Discuss considerations for improving application of recommended preventive measures for perineal dermatitis

**1. Which of the following processes leads to an increase in skin pH?**

- a. Oxidation of urine nitrogen
- b. Conversion of urea to ammonia
- c. Acid release with epithelial cell death
- d. Overgrowth of aerobic microorganisms in urine

**2. Which of the following factors creates the barrier known as intact epithelium?**

- a. High fatty acid content of the skin
- b. Alkaline skin pH
- c. Individual skin cells
- d. Moderate skin moisture levels

**3. What percentage of patients in an acute care setting have fecal incontinence?**

- a. 33%
- b. 50%
- c. 55%
- d. 17%

**4. What is normal skin pH?**

- a. 10.7 to 11.1
- b. 6.1 to 6.5
- c. 7.0 to 7.4
- d. 5.5 to 5.9

**5. Which of the following statements is true?**

- a. Perspiration increases skin acidity.
- b. Fatty acid content of the skin is altered by the presence of microorganisms such as *Staphylococcus*.
- c. Perineal inflammation is called perineal dermatitis when it becomes severe enough to cause areas of denuded skin.
- d. Skin is a vital organ that should be addressed when caring for patient with multisystem organ failure.

**6. Cleansers specifically designed for perineal skin care typically contain what ingredient?**

- a. Surfactant
- b. No-rinse soap
- c. Antiseptic
- d. Aloe

**7. Which of the following considerations will best ensure the success of a perineal dermatitis prevention program?**

- a. Preventive measures with high efficacy and moderate ease of use
- b. Preventive measures with high ease of use and moderate efficacy
- c. Involvement of nursing staff at all levels of patient care
- d. Strict requirements for and monitoring of staff compliance with the recommended preventive measures

**8. Zinc oxide is an example of what type of perineal care agent?**

- a. Skin cleanser
- b. Antimicrobial
- c. Moisture barrier
- d. Skin moisturizer

**9. The study reported in the article included patients who had which of the following?**

- a. Urinary incontinence
- b. Multiple admissions to the intensive care unit
- c. No skin breakdown upon admission
- d. Allergies to traditional cleaning agents

**10. Which of the following is of primary importance in whether a perineal dermatitis preventive care intervention will be effective?**

- a. Compliance with a treatment protocol
- b. Level of education of nursing staff
- c. Patients' acuity levels
- d. Patients' diagnoses

**11. Which of the following factors contribute to development of perineal dermatitis?**

- a. Patient race and medical history
- b. Patient nutritional status and primary diagnosis
- c. Patient hydration status and type of mattress used on the hospital bed
- d. Patient weight and C-reactive protein level

**12. Which of the following statements regarding perineal dermatitis is true?**

- a. Consistent use of both a cleanser and skin protectant most successfully prevents the development of perineal dermatitis.
- b. Skin moisturizers should be avoided for patients in intensive care unit settings.
- c. Soap and water are more effective than commercially prepared cleansers for prevention of perineal dermatitis.
- d. Urinary incontinence is the single-most contributing factor in development of perineal dermatitis.

Test answers: Mark only one box for your answer to each question. You may photocopy this form.

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