

InterDry[®] Case Studies

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Introduction to skin fold management

Author: Dr. Susan Gallagher, PhD, MSN, MA, RN, CBN, HCRM, CSPHP

Historical challenges

Over the past few decades healthcare providers have struggled to address issues of skin fold management. Powders and creams have been the mainstay of treatment. More creative processes have included taping skin folds apart or placing flannel or cotton fabric between skin folds to discourage skin-to-skin contact. Resolution of skin injury may be achieved; however, the process has been time consuming and costly. Historically, a solution to skin fold management has been elusive.

Special patient populations

From a clinical perspective, excess moisture often leads to intertriginous dermatitis (ITD), especially in the presence of deep cutaneous folds. Obesity is thought to be a primary factor in the development of ITD because the presence of skin folds places the patient at greater risk of prolonged skin-to-skin contact. ITD often occurs among adults, children or infants who are obese or who have a weight maldistribution. Inflammation may develop under or within abdominal folds, in neck creases, or in popliteal or antecubital fossae. However, a number of different types of individuals can develop this condition. For example, in addition to obesity, risk factors for ITD include: hyperhidrosis; systemic infection; chronic steroid and antibiotic use; immunosuppression; immobility; and diabetes, especially in the presence of excess moisture.

Most agree a gender or ethnic/racial component does not exist; however, age may be a factor. The very old and very young are typically affected more often due to reduced immunity, immobilization, and moisture. Further, in the aging population, age-related tissue loss is associated with ITD. For instance, as the mandible shrinks in elderly persons and the vertical dimensions decrease around the mouth, inflammation and ITD can occur under and within the accentuated nasolabial folds. ITD manifests in a number of areas over the aging body. Digital ITD is not uncommon among individuals who have contractures due to stroke or any other condition that impairs use of the hands and fingers. Any area of the body where there is prolonged skin-to-skin contact is vulnerable. All risk factors are aggravated by hot and humid conditions. Thus, a regional factor exists as well as a patient population component.

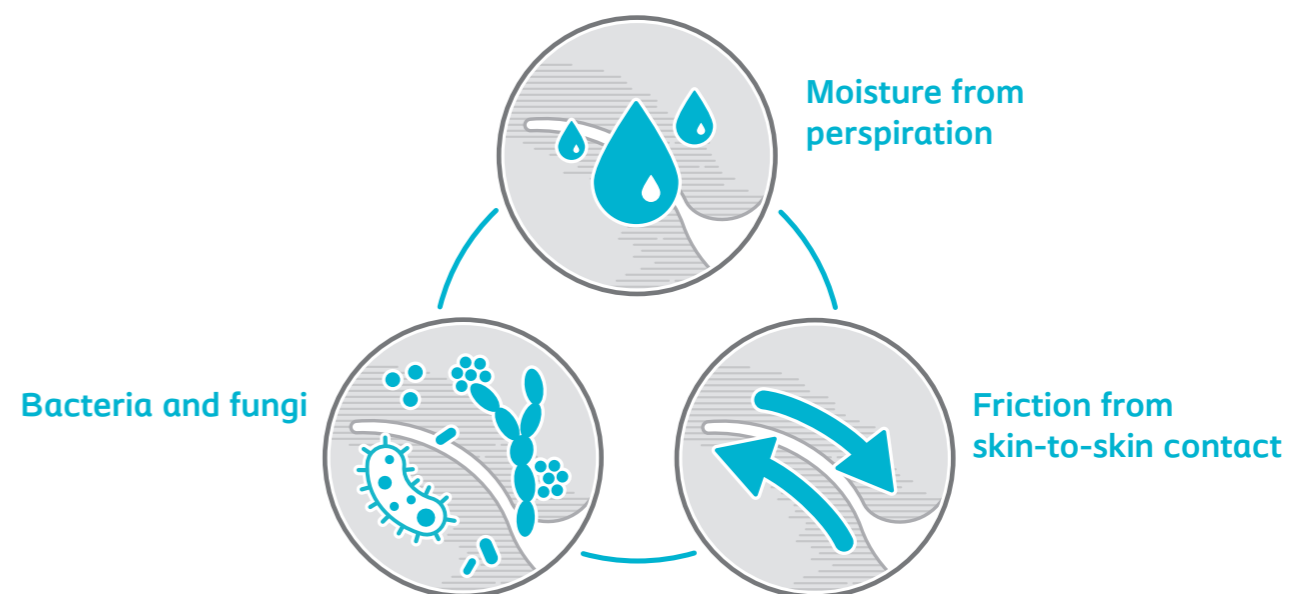
Unfortunately, the true prevalence of ITD is unknown in a general sense, research suggests that the issue is pervasive among certain populations, and affected individuals do not always seek medical treatment. For example, McMahon and others reported that in a survey of 1116 hospitalized female patients, 11.2% had active or resolved inframammary lesions. Researchers found the prevalence was higher among elderly individuals or those with mental illness. Mathur and others describe a higher rate of ITD among obese adolescents. Although the numbers of critically ill patients who experience ITD is not clear, anecdotally, providers understand this is a high-risk group for several reasons. For instance, in the intensive care areas patients generally experience an increased exposure to moisture due to increased perspiration associated with illness/diseases, fever or medications. There is more opportunity for skin-to-skin contact while in the lying position and an increase in skin friction with movement in bed. Restriction of movement can also be a risk factor, for example because of hemodynamic instability or reluctance to move a complex, critically ill individual.

Clinical and economic concerns

Some experts contend that prevention is a more appropriate alternative to treatment and recommend a number of preventive strategies. For example, patients are advised to control blood sugar, use cotton undergarments, lose weight, avoid tight clothing and avoid unnecessary antibiotic or steroid use. Experts suggest keeping the area dry and exposed to the air as much as possible to prevent recurrences.

As indicated in the McMahon study, many individuals have resolution of the ITD once their general condition improves. However, recurrence of ITD is common. Recurrences lead to direct and indirect costs. Indirect costs include time away from work, home and family; travel time to providers; embarrassment from odor; threats to productivity due to discomfort; frustration and more. Direct costs might include dressings, antibiotics, laboratory studies, home, office or acute care, expenses not covered by the patient's insurance carrier and more. Skin fold management has become an ongoing struggle for many individuals from a humanistic, clinical and economic perspective.

Most treatments fail to address all three factors associated with skin fold management⁸



Standard treatments for intertrigo, such as drying agents, barrier creams, topical antifungals and absorptive materials tend to address **only one or two factors** associated with intertrigo.

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When ITD hits home: best practice tips for using a moisture-wicking fabric with silver for intertriginous dermatitis

Author: Patti Haberer, MA, BSN, RN, CWOCN and Clinical Consultant for Coloplast Corp

Presented at the 7th Annual Symposium on Advanced Wound Care, September 2015

Presented at the Southeast Region of the WOCN[®] Society Annual Conference, September 2015

Introduction

Intertriginous dermatitis (ITD), also known as intertrigo, is one of the four most common forms of moisture-associated skin damage.¹ ITD is defined as inflammation resulting from moisture trapped in skin folds subject to friction.² Symptoms include erythema, inflammation, maceration, erosion/denudation, odor and pain of the skin inside and adjacent to skin folds.^{1,2,3} Major risk factors include hyperhidrosis; obesity, especially with pendulous breasts; deep skin folds; immobility and diabetes mellitus.² All risk factors are exacerbated by hot, humid conditions.² The most common fungal organisms in ITD are *Candida*.³ However, a recent study found *Candida* is not the most prevalent organism found in skin folds.⁴ Standard treatments often used for ITD, such as drying agents, barrier creams, topical antifungals and absorptive materials, may be ineffective in some patients.² Moisture-wicking fabric with silver has been shown to relieve the signs and symptoms of ITD within a five-day period.⁵

Purpose

The objective of this case study was to share best practice tips using a moisture-wicking fabric with antimicrobial silver.

Case Discussion

After residing in an assisted living facility in Texas for two years, it was time to move my 80-year-old family member closer me. She traveled with my husband and I on a two day, 1000-mile road trip to her new home in Florida. Her medical history includes obesity (5'3", 172 pounds, BMI 30.5), bilateral mastectomy, uncontrolled diabetes, hypertension, hyperlipidemia, and dementia. Following her first morning shower, I noticed a mild case of ITD (erythema and pain) within her right axilla. This necessitated a further assessment of all skin folds, revealing a severe case of ITD (erythema, maceration, satellite lesions, denuded skin at the base of the fold, odor and pain) under her large pannus. A moisture-wicking fabric with silver was applied to both areas to manage the complications associated with skin folds: moisture, friction and fungal / bacterial organisms.

Conclusion

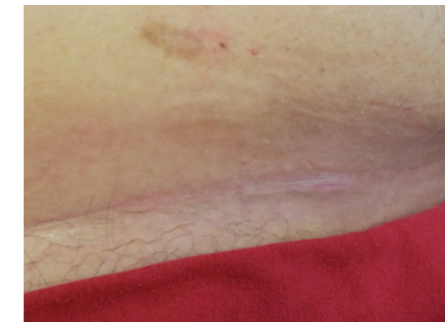
The moisture-wicking fabric with antimicrobial silver quickly and effectively resolved both cases of intertriginous dermatitis (ITD).

- At Day 2 the erythema and pain in the axilla was 100% resolved
- At Day 5 the erythema, satellite lesions, odor, denuded area and pain under the pannus was 100% resolved

RESULTS: PANNUS



Day 1: Severe case of ITD (erythema, maceration, satellite lesions, denuded skin at the base of the fold, odor and pain).



Day 3: Erythema, maceration, satellite lesions and odor had resolved. Denuded area partially resolved.



Day 5: 100% resolved.

RESULTS: AXILLA



Day 1: Mild case of ITD (erythema and pain).



Day 2: Erythema and pain had resolved.

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Best practice tips



PREVENT FURTHER TRAUMA

Clean the painful, denuded areas with a no-rinse, self-sudsing, disposable washcloth to prevent further trauma. Carefully dry with a soft towel.

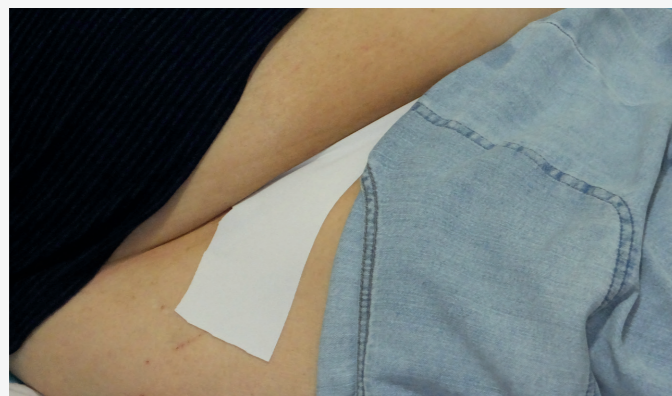


PREVENT DISLODGE- MENT DURING ROUTINE ACTIVITIES OF DAILY LIVING

The moisture-wicking fabric was originally positioned to allow for a 2" overhang below the pannus.

During toileting the moisture-wicking fabric was inadvertently removed.

Moisture-wicking fabric was repositioned to allow for a 2" overhang to be exposed on either side of the pannus.



Treating complications associated with skin folds in a bariatric patient

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Introduction

A 66-year-old, 425 lbs. (193 kg) male with congestive heart failure (CHF), a history of chronic obstructive pulmonary disease, obstructed sleep apnea, chronic left leg ulcer and morbid obesity was admitted to the hospital for CHF.

The WOC nurse was called to consult on a venous leg ulcer (VLU) and upon further assessment and dialogue with the patient, she conducted an assessment of all his skin folds. Her findings included erythema at the patient's chest skin fold (Figure 1).

The patient informed the WOC nurse that he had recently begun to experience extreme pain, itching and odor. The patient had unsuccessfully tried to treat the area with creams that he found difficult to apply, expensive and took time to be effective.

Management of the skin fold

A moisture-wicking fabric with silver (InterDry® - Coloplast Canada Corp.) was applied in the skin folds on October 28 (Figure 2). On Day 7 (November 4) (Figure 3) there was no erythema or redness and the odor and discomfort had subsided.

The patient continued to use InterDry until discharge on Day 17 (November 14) when all symptoms of redness, itching and odor had been eliminated. The patient was also supplied with InterDry to continue using after discharge.

Conclusion

It is of paramount importance to complete a thorough assessment including skin folds when evaluating a high-risk bariatric patient. By Day 7, the moisture-wicking fabric with silver effectively reduced signs of inflammation, discomfort and odor. This is likely a result of the fabric's ability to wick away moisture, reduce skin-to-skin friction due to its polyurethane coating, and release ionic silver which further reduces microorganisms that cause odor.



Figure 1

Severe case of ITD (erythema, maceration, satellite lesions, denuded skin at the base of the fold, odor and pain).



Figure 2

Moisture-wicking fabric with silver (InterDry – Coloplast Canada Corp.) was applied on Day 1 by the WOC nurse with goals focused toward wicking excess moisture, reducing inflammation and in turn, reducing pain, itching, erythema, and eliminating odor-causing microorganisms.



Figure 3

Day 7 after applying the moisture-wicking fabric with silver, the patient and care giver noticed an almost complete elimination of symptoms.

Multi-site feasibility study using a new textile with silver for management of skin conditions located in skin folds

Authors: Karen Lou Kennedy-Evans, RN, CS, FNP; Barbara Viggiano, RN, WCC; Theresa Henn, BSN, RN-CS, G/ANP; Debra Smith, RN

Presented at the 20th Annual Symposium on Advanced Wound Care, April 2007
Presented at the 39th WOCN® Society Annual Conference, June 2007

Introduction

Intertrigo results from excess moisture and skin-to-skin friction occurring in natural skin folds, such as those found in the groin, abdomen, under breasts, legs, neck, and arms.¹ When intertrigo is left untreated, complications may result such as secondary bacterial or fungal infections.^{2,3} Standard treatments consisting of drying agents, barrier creams, topical antifungals, and absorptive materials are often ineffective.

Purpose

This feasibility study was designed to determine the efficacy of InterDry® used in place of the standard treatments.

Methodology

Subjects were enrolled from two (2) long-term care centers after signing the IRB approved consent form. Assessments occurred on Day 1, 3, and 5 for erythema, maceration, denudement, itching/burning, satellite lesions and odor. The amount of test product used was recorded.

Case Study 1: 46-year-old female receiving rehabilitation (physical therapy and weight loss) for morbid obesity (BMI 93.8). Other diagnoses include osteoarthritis, lupus, type II diabetes mellitus, and hypothyroidism. Skin assessment: candidal intertrigo located in the right posterior thigh, which has been present for the past 98 days. The current skin care protocol includes daily cleansing with Bedside-Care® Foam followed by an application of antimicrobial cream^a mixed equal parts with

Subjects

Twenty-one (21) subjects entered the study, with twenty (20) having complete data. Mean age 53.8 years. Mean BMI 54.75. Data was collected from each subject on Day 1 (Baseline), Day 3, and Day 5. Missing data was treated using the Last Observation Carry Forward (LOCF) technique. The Paired Sign Test was used for all analyses.

Conclusion

InterDry provided the environment to relieve the subjects' symptoms of intertrigo and/or candidal intertrigo in a five (5) day period. InterDry is an innovative product with impressive and dramatic results eliminating the need for multiple products that were ineffective. The subjects liked using the new product. They appreciated the comfort of not having moist skin and the absence of messy powders or creams on their skin.

an antifungal cortisone^b cream daily and an antifungal powder^c as needed. She also has an order for an antifungal powder^c mixed equal parts with and antifungal cortisone^b cream.

Study Skin Care Protocol: Cleanse the skin with Bedside-Care Foam. Place InterDry® in the skin fold. Reposition as needed. Replace if soiled. Discard on Day five (5).



Day 1

Erythema score: 3 - Severe
Denudement: Yes
Maceration: Yes
Satellite lesions: Yes
Itching/burning: Yes
Odor score: 1 - Slight



Day 5

Erythema score: 1 - Slight
Denudement: No
Maceration: No
Satellite lesions: No
Itching/burning: No
Odor score: 0 - None

Case Study 2: 34-year-old female receiving rehabilitation (weight loss and physical therapy) with morbid obesity (BMI 61.1). Other diagnoses include cellulitis bilateral lower extremities, chronic obstructive pulmonary disease, elephantiasis vs. lymphedema and chronic pain. Skin assessment: candidal intertrigo in the right popliteal area, which has been present for the past thirty-three

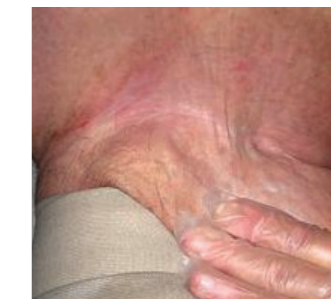
(33) weeks. The current skin care protocol includes a daily body wash^d followed by an antifungal ointment^e as needed. She wore lower leg lymphedema wraps.

Study Skin Care Protocol: Cleanse the skin with Bedside-Care Foam. Place InterDry in the skin fold. Reposition as needed. Replace if soiled. Discard on Day five (5).



Day 1

Erythema score: 3 - Severe
Denudement: Yes
Maceration: Yes
Satellite lesions: Yes
Itching/burning: Yes
Odor score: 2 - Moderate



Day 5

Erythema score: 1 - Slight
Denudement: Yes (Improving, skin is fragile and tears easily)
Maceration: No
Satellite lesions: No
Itching/burning: No
Odor score: 0 - None

Case Study 3: 53-year-old female with morbid obesity (BMI 62.8), angina, pulmonary embolism, venous insufficiency and bipolar disorder. She is unable to ambulate; a chair lift is used to position her in a wheelchair. Skin assessment: intertrigo under the left breast, which has been present for twelve (12) weeks. The current skin care protocol includes cleansing with a body wash^d

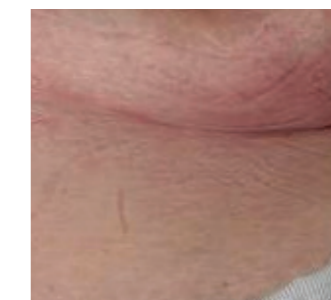
followed by a lotion^f and an antifungal powder^e two times a day and as needed.

Study Skin Care Protocol: Cleanse the skin with Bedside-Care Foam. Place InterDry in the skin fold. Reposition as needed. Replace if soiled. Discard on Day five (5).



Day 1

Erythema Score: 3 - Severe
Denudement: Yes
Maceration: Yes
Satellite lesions: Yes
Itching/burning: Yes
Odor score: 1 - Minimal



Day 5

Erythema Score: 1 - Slight (dry flaking skin continues)
Denudement: No
Maceration: No
Satellite lesions: No
Itching/burning: No
Odor score: 0 - None

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Product notations

- a. Silvadene®, Monarch Pharmaceuticals Inc. a subsidiary of Pfizer, Bristol, TN
- b. Mycolog II, Fougere Pharmaceuticals Inc., Melville, NY
- c. Nystop®, Paddock Laboratories, Inc., Minneapolis, MN
- d. Aloe Vesta®, ConvaTec, Bridgewater, NJ
- e. Aloe Vesta® 2 n 1 antifungal ointment, ConvaTec, Bridgewater, NJ
- f. Aloe Vesta® Lotion, ConvaTec, Bridgewater, NJ

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Moisture management challenges for the WOC nurse

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Reduction in itching/burning: Fifteen (15) subjects had itching/burning on Day 1. On Day 5, zero (0) subjects had itching/burning. There was a statistically significant reduction in itching/burning ($P = .0001$) by Day 3 and ($P < .0001$) by Day 5.

Reduction in maceration: Ten (10) subjects had maceration on Day 1. One (1) subject had maceration on Day 3 and Day 5 resulting from textile becoming soiled with urine and not being removed immediately.

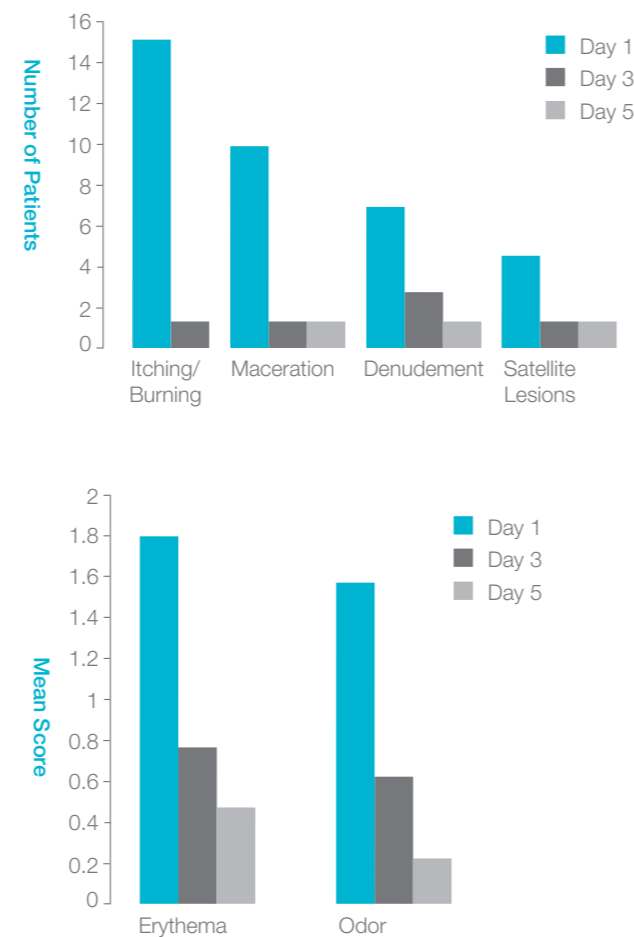
Reduction in denudement: Seven (7) subjects had denudement on Day 1. On Day 5, two (2) subjects had denudement that was improving. There was a significant reduction on Day 3 ($P = .125$) and on Day 5 ($P = .062$).

Reduction in satellite lesions: Five (5) subjects had satellite lesions on Day 1. On Day 3 and Day 5, one (1) subject had satellite lesions that were improving.

Reduction in erythema: All of the subjects (21) entered the study with erythema. There was a statistically significant reduction in erythema ($P < .0001$) by Day 3 and Day 5.

Reduction in open odor: Twelve (12) subjects had odor on Day 1. There was a statistically significant reduction in separated odor ($P = .0020$) by Day 3 and ($P = .0034$) by Day 5. Two (2) subjects with odor on Day 5 had improved significantly from Day 1. Note: One (1) subject had no odor on Day 1 and Day 3 and minimal odor (scarcely noticeable) on Day 5 due to the textile being soiled with urine and left in place.

Reduction in closed odor: Closed odor was not statistically analyzed. One (1) subject had closed odor on Day 1. On Day 3 and Day 5, zero (0) subjects had closed odor.



Introduction

Moisture management poses a particularly difficult challenge for the WOC nurse. Frequently, the WOC nurse is called when skin conditions arise from highly exudative venous stasis ulcers, excessive sweating (hyperhidrosis), intertrigo of deep skin folds, interdigital space maceration or periwound skin maceration resulting from draining wounds.

In our practice we have encountered denudement related to poorly managed moisture or failure of wounds to progress in the presence of copious drainage. Patients report comfort concerns related to burning, itching, and pain. Furthermore, secondary skin infections frequently occur following prolonged exposure to moisture in dark, warm environments such as under compression wraps, in deep skin folds, and in interdigital spaces. Traditional methods of moisture management are not always easy, reliable or successful. There are multiple treatment options available to achieve the goal of moisture management, and the decision-making tree is multifaceted in determining etiology and corresponding treatments. Products that address moisture control through different mechanisms (e.g., absorption, wicking, and barriers) may lead to further complications. The problem is further complicated when treatment of secondary infections is necessary. There is often confusion in implementing treatment modalities and in educating the patient and/or caregivers. Therefore, a time-efficient, patient- and caregiver-friendly, cost-effective solution is sought.

Our desire for this research was to explore a single treatment option that eliminated the potential for product conflicts, and to simplify and streamline the treatment of skin conditions resulting from excessive skin hydration. Overall, the most important goal of this research was patient comfort and effective moisture management.

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Objective

The objective of this case study series was to explore the use of InterDry[®], combined with appropriate topical wound treatment, to manage skin conditions resulting from exposure to excessive moisture.

Method

This study was an open-label, non-randomized and non-comparative case study evaluation of the clinical utility of InterDry. Patients were selected for inclusion based on the clinical judgment of the study investigators, and on failure of previous methods of skin moisture and/or microbial control. All patients agreed to participate in the case study and signed consent for photography.

Conclusion

1. InterDry provided effective moisture management and microbial control in these four challenging clinical situations:
 - Intertrigo of interdigital spaces
 - Intertrigo of the axilla
 - Venous dermatitis complicated with hyperhidrosis
 - Maceration and malodor associated with skin occlusion by an external appliance
2. InterDry was well received by both the patient and staff as it streamlined the process of moisture and microbial control into simple and easily implemented protocols of care.
3. Further research is warranted to develop additional protocols of care for moisture and microbial control using InterDry.

Case Study 1: A 69-year-old paraplegic male with severe peripheral arterial disease and known occlusion of the aortoiliac junction presented with maceration between his toes. Prior medical history included multiple back surgeries due to a benign spinal tumor and skin grafting resulting from radiation treatment approximately 50 years ago. Additional medical history included hypertension, dyslipidemia, non-insulin-dependent

diabetes mellitus (NIDDM) type 2, venous insufficiency, diabetic neuropathic ulceration of the right foot, and venous insufficiency of the right lower extremity.

A one-inch strip of InterDry® was woven between his toes and changed daily following bathing. The maceration resolved within three days of treatment.



Maceration between toes before intervention.



InterDry between toes.



Resolution of maceration within 72 hours.

Case Study 2: A 44-year-old male presented with intertrigo in his axilla, panniculus and groin folds. The patient had a history of alcoholism and was admitted for alcohol poisoning. Before the WOC nurse was consulted, the treatment was an antifungal-steroid cream combination. The affected areas were painful; and the moist desquamation and patient compliance with a new treatment were concerns.

Treatment was changed from the cream to InterDry. Within 24 hours, the moist desquamation was significantly improved. Within one week, the affected areas were completely healed.



Intertrigo of the axilla before intervention.



InterDry placed in the axilla.



Resolution of intertrigo after 1 week.

Evaluation of a skin fold management textile with antimicrobial silver complex in a variety of case studies

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Introduction

Intertrigo, a dermatitis that is often painful, results from moisture and friction in skin folds or juxtaposed skin areas. Intertrigo is difficult to treat and often results in complications, such as secondary bacterial or fungal infections and pressure ulcers. Clinicians often select treatments such as lotions, creams, powders, oral antifungal treatments, towels, pillowcases, baby blankets and absorbent briefs to control moisture and address the erythema and rashes associated with intertrigo. These measures are generally ineffective long-term solutions and may even contribute to the development of pressure ulcers through the creation of new pressure points. Case studies are presented that demonstrate the effectiveness of InterDry®, a skin fold management product that is a 100% polyester knitted textile with antimicrobial silver complex. It is designed to manage moisture, friction and odor.

Purpose

The objective of this case study series was to explore the use of InterDry to manage skin conditions resulting from exposure to excessive moisture in skin folds.

Methodology

This study was an open-label, non-randomized and non-comparative case study evaluation.

Conclusion

InterDry provided effective moisture management and microbial control in four challenging clinical situations. The product was well received by both the patient and staff as it streamlined the process of moisture and microbial control into simple and easily implemented protocols of care.

Case Study 1: 92-year-old female patient presented for care of venous stasis ulceration complicated of a persistent, painful rash underneath her breasts that had been unresponsive to treatment with topical creams and powders. Patient's past medical history included chronic venous insufficiency, venous stasis ulceration, hypertension, and diabetes.

Skin Assessment: Candidal intertrigo with erythematous papules, satellite lesions, denudement, weeping and a musty odor. Past treatment included prescription

antifungal powder applied twice daily and an oral antifungal administered daily for five days. The rash persisted and she was then treated with an antifungal cream applied two times daily for two weeks. The treatments were not effective.

Skin Assessment: Two strips of InterDry® under each breast using a cotton sports bra to keep textile in place. The patient followed up weekly, with improvement noted at Week 2 and resolution of symptoms and rash by Week 3.



Candidal intertrigo beneath both breasts at initial visit.

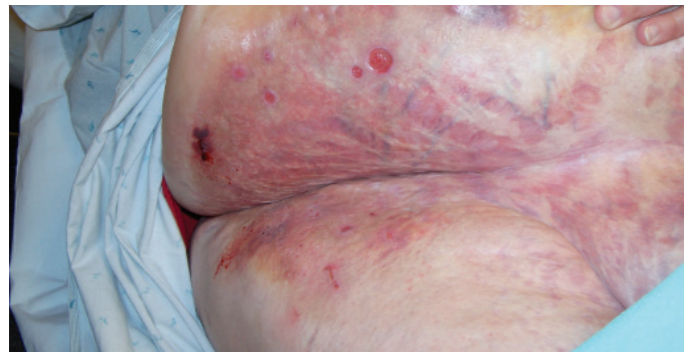


Week 3 resolution of candidal intertrigo beneath both breasts.

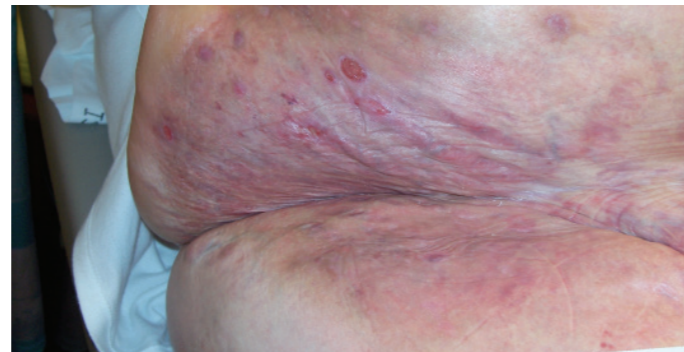
Case Study 2: 41-year-old female patient presented with non-healing ulcers and rash under her abdominal pannus. The patient was scheduled for bariatric surgery and at her preoperative physical was told she would not be able to proceed until her rash and ulcers were resolved. Patient's past medical history included morbid obesity, situs inversus totalis, diabetes, arthritis, hypertension, sleep apnea, and pseudotumor cerebri diverticulitis.

Skin Assessment: Candidal intertrigo with erythema, pain, cutaneous erosions with bleeding and a sweet odor. Cultures were completed and revealed mild *Pseudomonas* infection and candidiasis. Past treatment included oral and topical antifungal treatment, paper towels, washcloths and baby diapers. The rash and symptoms never resolved.

Skin Assessment: InterDry beneath the abdominal pannus. The patient followed up in one week with complete resolution of her candidal intertrigo and resolving erosions. The patient returned to the surgeon who scheduled her bariatric surgery.



Initial visit showing candidal intertrigo beneath the abdominal pannus with erosions and *Pseudomonas* infection.



Week 1 follow-up visit showing resolution of candidal intertrigo and improving condition of erosions.

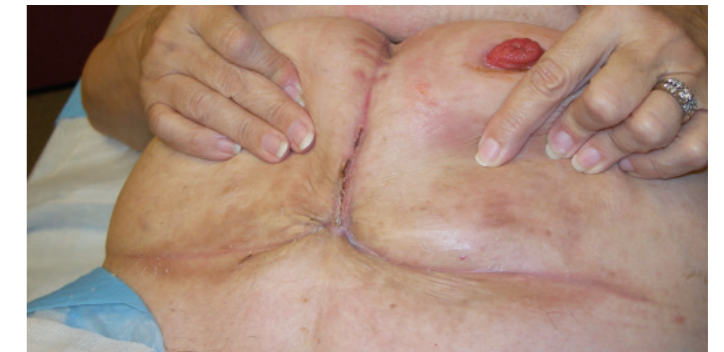
Case Study 3: 67-year-old female patient presented for a follow-up after hospitalization for perforated sigmoid diverticuli with surgical intervention and subsequent diversion of fecal stream with end loop colostomy and Hartmann's pouch formation. She was experiencing a red rash that was painful and itching below her pouch and abdominal fold. Patient's past medical history included breast cancer, Bell's palsy, osteoporosis, depression, and dyslipidemia.

Skin Assessment: Candidal intertrigo underneath the abdominal pannus and colostomy pouch with satellite lesions, erythematous papules, denudement, weeping and a musty odor. Past treatment included an oral antifungal regime for 5 days in conjunction with an antifungal powder. She did have some improvement of symptoms under the colostomy-pouching surface but the intertrigo did not improve.

Skin Assessment: InterDry under the abdominal pannus using cotton underwear to keep textile in place. The patient followed up in one week with marked improvement and at the fourteen-day follow-up the patient had complete resolution of the candidal intertrigo.



Candidal intertrigo beneath the abdominal pannus at initial visit.



Day 14 resolution of candidal intertrigo beneath the abdominal pannus.

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