Intertriginous Dermatitis and Common Microorganisms

Moisture and Skin Fold Management

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Intertriginous Dermatitis

Definition
• Intertriginous dermatitis (ITD) is inflammatory dermatosis of opposing skin folds\(^1\)
• A form of dermatitis from non-caustic body fluid (sweat) vs. caustic fluids (urine and stool)\(^2\)
• Affects opposing cutaneous and mucocutaneous surfaces

Epidemiology

• 11.2% of 1116 women reported inflammatory ITD\(^1\)
• 63% of 100 obese patients\(^2\)
• Unknown in hospitalized patients

Photos Courtesy of Dr. Joyce Black

Anatomy and physiology of perspiration

- Sweat gland found in dermis
- Controlled by nerve from sympathetic nervous system (fight or flight)
- Body temperature regulation
- Profuse sweating leads to water and sodium loss
- Microorganisms can enter sebaceous glands or hair follicle

Areas of increased sweat and moisture are capable of harvesting more infectious organisms than drier areas of skin (McMahon 1991)

Etiology of skin damage

- Moisture from sweat is trapped in the skin fold
  - Normally, skin fold is dry due to body movement and air flow
  - For the obese: sweat excessively due to large body mass and relatively small skin surface to maintain body temp
- Excess moisture is absorbed by the keratinocytes
- Cells become boggy and do not glide easily
- Small open areas develop

Pathophysiology of ITD

- Obesity alters skin barrier function
  - Increased transepidermal water loss and erythema
  - Increased sweat gland activity → physiological change of body mass
- Decreased blood flow in adipose tissue
- Bacteria harbored in the sweat and oil gland
- Skin pH increased in inguinal skin folds in obese women
- Diabetes, steroid use and broad spectrum antibiotics also contribute to ITD
Who’s at Risk?

Bedridden hospitalized patients

- Increased exposure to moisture
- Increased sweat production with diseases, fever and medications
- Skin on skin contact while in bed
- Friction with movement in bed
- Lack of air flow associated with the restriction of movement
- Presence of nosocomial bacteria

This patient, usually mobile can keep the skin fold dry. Once confined to bed, it rests on her thighs.

Braden Moisture Subscale:

“For patients who produce excess amounts of sweat, especially in the skin folds, organizations can use a knitted polyester fabric that is impregnated with silver complex to wick sweat out of the skin folds and away from the body.”

JCAHO – Perspectives on Patient Safety

What does ITD look like?

- itching, burning type pain from the raw skin folds
- Usually a moistened area
- Aggravated by sweating or washing the skin
- Inflamed skin in the skin fold
- Open skin lesions
Complications of ITD
- Candidiasis?
- Cellulitis
- Wound infection
- Surgical site infection?
- Odor/embarassment
- Pain

Complications are probably greater than anybody appreciates and even more... under appreciated!

Skin Creases

What is in that skin fold?
Organisms other than Candida albicans were cultured:

Axilla
- Proteus mirabilis
- Enterococcus faecalis
- Staphylococcus coag. neg.

Breast
- Proteus mirabilis
- Staphylococcus coag. neg.
- Diphtheroids

Skin
- Staphylococcus coag. neg.
- Candida albicans
- Diphtheroids
- Escherichia coli

What if the incision the surgeon is making is through the skin is in or near a heavily contaminated skin fold?

Axilla
- Proteus mirabilis
- Enterococcus faecalis

Breast
- Proteus mirabilis
- Enterococcus faecalis

Knee
- Proteus mirabilis
- Staphylococcus coag. neg.
Additional findings

No relationship found between:
• Type or quantity of microorganism cultured
• Location or the severity of the erythema, odor or skin temperature

Why are skin folds so important?

HAI’s are a major public health concern in the U.S.

• CDC estimates 1.7 million people develop HAI’s yearly
• Patients who experience HAI’s:
  • Longer hospital stays
  • Utilize more healthcare resources
  • Greater risk for readmission & death

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Healthcare Associated Infections (HAI’s)

- Ventilator-associated pneumonia (VAP)
- Central line-associated bloodstream infections (CLABSI)
- Surgical site infection (SSI)
- Catheter-associated urinary tract infection (CAUTI)

13% 14% 17% 34%

Bacterial/fungal invasion from the skin

Account for nearly half of HAI’s in the acute care setting
Skin is implicated as a source of infection.

- Naturally occurring microorganisms on the skin’s surface can enter:
  - Incision site
  - Bloodstream

   The number one cause of bloodstream & SSIs

_Could skin fold contamination be contaminating our surgical sites?_

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Skin folds and surgical sites

**Risk factors for surgical site infections (SSI)**
- Chronic inflammation
- Obesity
- Organism overgrowth

**Organisms common to surgical site infections and skin folds**
- Staphylococcus
- Staphylococcus coagulase negative
- Enterococcus sp.
- Escherichia coli
- Pseudomonas aeruginosa

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Surgical procedures involving skin folds

With surgical incisions, organisms can gain access to subcutaneous tissues and cause infection.
Preventing SSI’s: an important post-operative outcome

Good practice is to control moisture, friction and bacteria or fungi to reduce risk of contaminating a surgical site.

Silver Wicking Textile

- Translocate skin moisture
- Reduce friction
- Antimicrobial Silver control bacterial and fungal overgrowth

Inhibition of growth with moisture wicking Ag-textile

<table>
<thead>
<tr>
<th>Microbes recovered from body sites diagnosed with Intertrigo</th>
<th>Inhibition in Kirby-Bauer Assay (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus epidermidis (coagulase neg)</td>
<td>7</td>
</tr>
<tr>
<td>Proteus mirabilis</td>
<td>2</td>
</tr>
<tr>
<td>Diphtheroid (Corynebacterium xerosis)</td>
<td>3</td>
</tr>
<tr>
<td>Enterococcus sp (VRE)</td>
<td>3</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>2</td>
</tr>
<tr>
<td>Streptococcus sp.</td>
<td>5</td>
</tr>
<tr>
<td>Acinetobacter baumannii</td>
<td>3</td>
</tr>
</tbody>
</table>

Other microbes possibly associated with Intertrigo:

| Staphylococcus aureus (MRSA)                               | 2                                   |
| Pseudomonas aeruginosa                                     | 6                                   |
| Klebsiella pneumoniae                                       | 4                                   |


Prevention and Management of Intertriginous Dermatitis
Identification of high risk patients

- Consider normal folds of tissue as “skin folds” when at bedrest
- Redundant tissue in breast
- Groin
- Consider skin beneath braces and splints as “skin folds”
- The devices keeps the sweat from evaporating
- Consider the toe web space in patients with diabetes a skin fold

Traditional methods: Ineffective, taking months to improve

Skin fold management

Control hyperhydrosis
- Keep skin folds dry
- Gently dry skin folds after bathing

Avoid using:
- Antiperspirants
- Bed linens, shop towels, paper towels, baby blankets
- Individual dressings … can get lost in deep skin folds
Treatment of Intertriginous Dermatitis

Actions
1. Cleanse skin fold gently
2. Apply textile to wick fluid from skin fold

Topical antifungal application may not solve the problem
• Organisms other than Candida albicans were cultured

Bed linens do not wick the sweat from the skin fold
• Over 50% of organisms cultured from were pathogenic

Symptoms
• Erythema
• Odor
• Satellite lesions
• Maceration
• Itching/burning

Treatment
• Antifungal ointment

Case study

Symptoms
• Erythema
• Satellite lesions
• Maceration
• Itching/burning

Treatment
• Diflucan® and Nystatin

Case study

Symptoms
• Erythema
• Odor
• Satellite lesions
• Maceration
• Itching/burning

Solution
• Silver wicking textile
Case study

Symptoms
- Erythema
- Maceration
- Itching/burning

Treatment
- Oral antifungal
- Antifungal powder

Symptoms
- All symptoms 100% resolved
- Rash completely resolved

Solution
- Silver wicking textile

Case study

Neuropathic ulceration of the right foot

Maceration between toes

Silver wicking textile woven between toes

72 hours resolution of maceration

Photos: D Netsch. ©2007 Coloplast Corp. Used with permission.

Case study

Palm and interdigital spaces of the left hand

Placement of Silver wicking textile

Silver wicking textile and brace

Resolution of maceration under brace

Photos: D Netsch. ©2007 Coloplast Corp. Used with permission.
Case study

60-year-old female-right sided mastectomy
- Erythema, denudement at right axillary fold
- Complaints of pain, odor and drainage
- Condition present x2 weeks
- Prior treatment: Nystatin powder

No resolution. Rash persisted.

E Maus, et. al. Hermann Center for Wound Healing and Lymphedema Management University of Texas Health Science Center, Houston, TX.

Significantly less drainage and redness
- Denuded skin nearly resolved
- No odor

Significant improvement in 7 days with silver wicking textile

Case study

42-year-old male with chronic, recurrent venous dermatitis in lower extremities
- Diagnosis: NIDDM (Type 2) with diabetic neuropathy and venous insufficiency
- Treated with compression wraps, but resulted in venous dermatitis and new ulceration due to maceration caused by excessive sweating

ITD develops in skin damaged by sweat combined with bacterial and fungal overgrowth

ITD is common but can be easily managed
What can we do to reduce the risk of HAI’s?

Roadblocks to Care

- Inconsistent implementation of proven infection prevention and control measures.
- Everyone is doing his or her own thing.
- Adherence to current prevention recommendations is suboptimal.
- Lack “top-down” mandate
- Bureaucracy → delays timeliness of interventions.

Standardized methods can minimize failure to identify and manage those patients at risk.

Skin Fold Guidelines

Patient name ______________________________

1. Gently cleanse the skin with a no-rinse cleanser and soft cloth daily
2. Pat dry or air dry
3. Place InterDry® Ag in the skin fold or under medical device
4. Allow 2 inches to be exposed to the air
5. Date and initial InterDry
6. Reposition as needed
7. Replace if soiled with urine, stool or blood.
8. Discard after 5 days of use

Date ______________

“Evidence suggests that merely increasing adherence to currently recommended practices can result in a dramatic reduction in infection rates, at least for some infection types.”

Goals of Care

Decrease frequency of expensive-to-manage complications

More reason to strive for every opportunity that leads to prevention

Professional organizations such as APIC continue to lead the way creating many elimination guides.

- Implement new measures and anti-infective products
- Adherence to recommended practices
- Belief in “ZERO”
- Incentivize
- Standardize methods
- Innovative practice
Key Points

- Skin fold inspection: an important part of skin assessment
- Effective skin fold management begins by identifying the cause
- Proper care of skin folds is critical to reducing the risk of SSIs
- Silver Wicking Textile:
  - Improves outcomes
  - Simplifies protocols
  - Reduces treatment time and cost

THANKS FOR JOINING US TODAY!!