Diaper Dermatitis: Diagnosis and Management of Complex Diaper Dermatitis in Neonates

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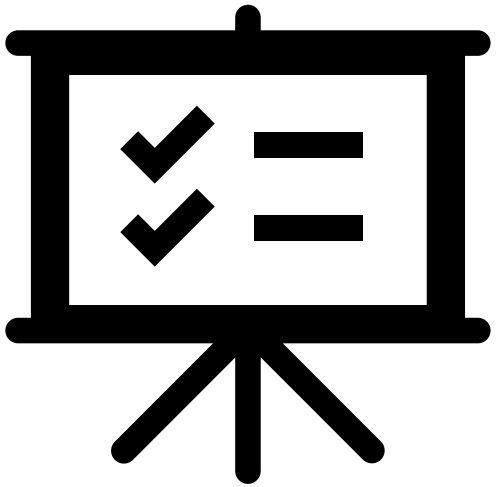
Disclosures

- I am a speaker for Urgo Medical (Vashe).
- I have no financial interests or relationships with any organizations or companies that could potentially create a conflict of interest for purposes of this lecture.
- Comments made regarding specific brand products are made solely to allow the audience to understand the topic and are not linked to any financial renumeration on my part.

Objectives

- Review the etiologies of diaper dermatitis.
- Describe the pathophysiology of diaper dermatitis.
- Review examples of diaper dermatitis assessment tools
- Discuss current brand products available for treatment of diaper dermatitis.
- Review a categorical approach towards treatment of diaper dermatitis

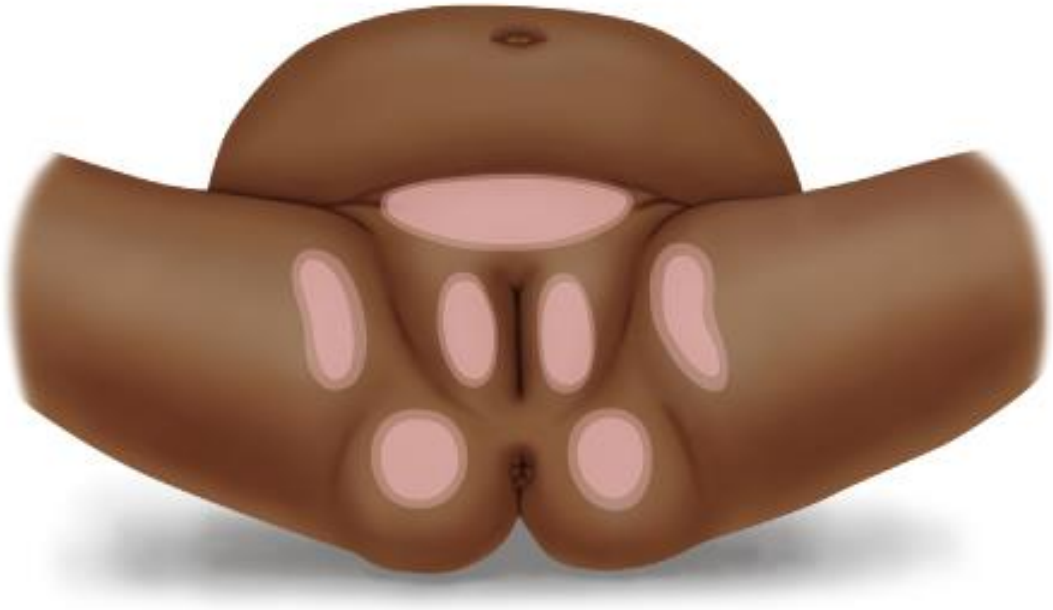


Introduction

Diaper dermatitis is an inflammatory reaction of the skin of the perineal and perianal areas.

It is the most common skin disorder seen in young infants.

It typically occurs on convex skin surfaces that are in direct contact with the diaper, including the buttocks, lower abdomen, genitalia and upper thighs.



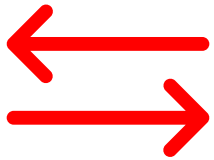
Diaper dermatitis is usually a mild and self-limited condition that requires minimal intervention in the older and term infant. However, in premature infants, aggressive intervention may be necessary to prevent serious erosive open wounds. Our discussion will focus on complex diaper dermatitis in the NICU patient.

Although most cases of diaper dermatitis are secondary to contact irritation, eruptions may also represent other more serious skin conditions that warrant consultation with dermatology if conditions do not respond to routine intervention.

Pathogenesis

There are four recognized elements that contribute to the local disruption of the skin barrier function that predispose to diaper dermatitis . These elements include the following:

Excessive moisture



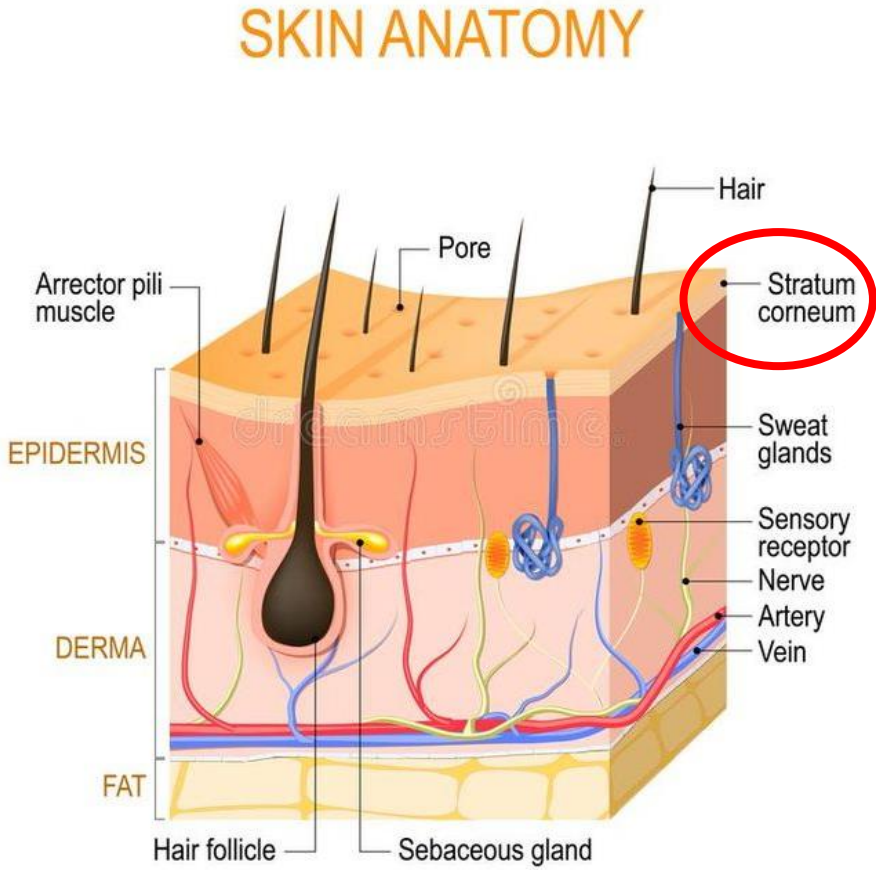
Friction

Increased pH

High enzymatic activity

Pathogenesis

- The combination of these four elements result in damage to the outer layer of the epidermis called the stratum corneum.
- The stratum corneum plays a critical role in permeability and moisture balance as well as antimicrobial defense.



Why is diaper dermatitis so much more severe in premature infants than term babies?

Stratum Corneum – Variations based on age

- In full term infants and adults, the stratum corneum is 10-20 layers thick
- In premature neonates <30 weeks, the stratum corneum is less than 2-3 layers
- 23-24 week premature infants have virtually no stratum corneum






Pathogenesis

Increased Moisture

(Occlusive effect of diaper + Stool/Urine)

⬇

Maceration and Damage to Stratum Corneum

⬇

Increased Susceptibility to Frictional Damage

⬇

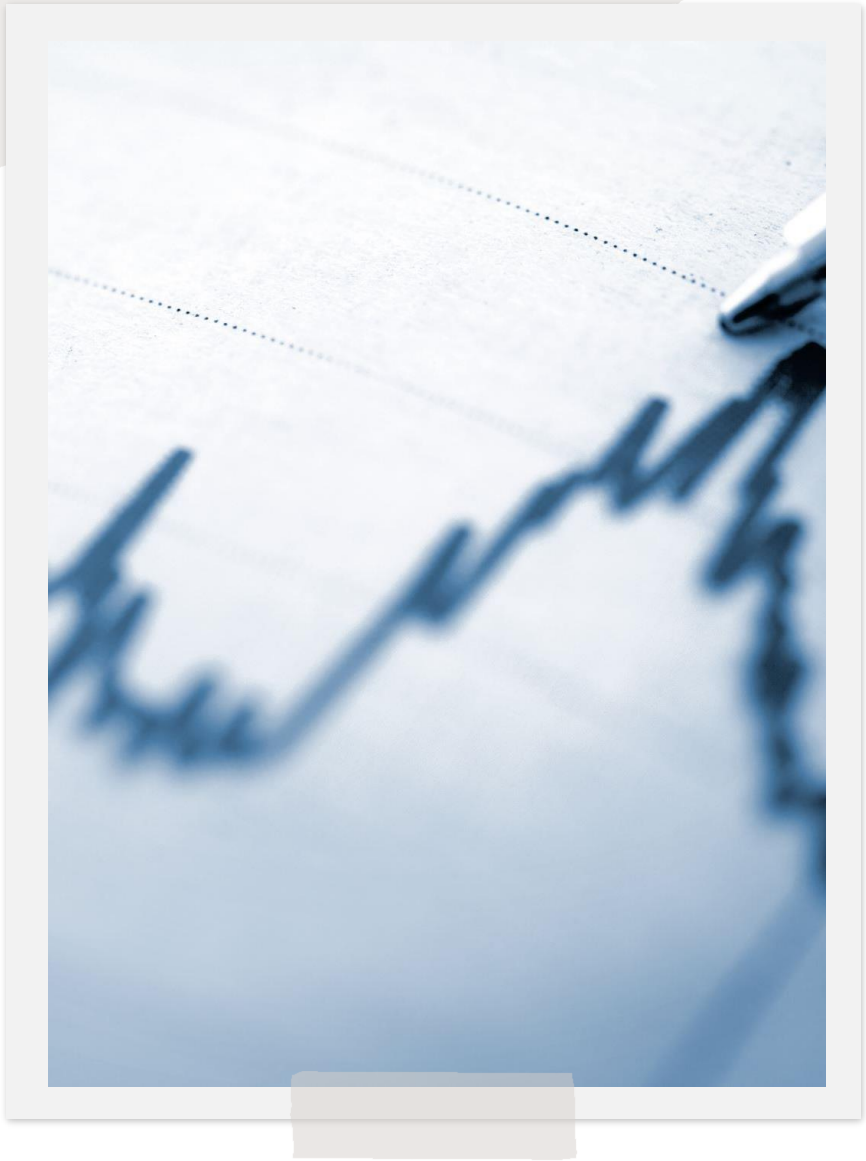
Further Impairment of Skin Barrier

⬇

Increased Penetration of Chemical Irritants and Microorganisms

Pathogenesis- the effect of chemical irritants and pH.

- Chemical irritants are derived from a combination of urine and stool.
- Fecal bacteria produce an enzyme called urease. Urease interacts with urine to increase the pH of the diaper area.
- When in a high pH environment, two other fecal enzymes (protease and lipase) directly irritate and damage skin causing an inflammatory reaction.
- Lastly, in a high pH environment, the skin is more susceptible to colonization by bacteria and yeast.



Risk Factors

There are risk factors associated with the development of diaper dermatitis, such as:

- Age: The skin of premature infants has a minimal protective barrier and shows increased susceptibility to trauma and irritants.
- Diet/Bowel Integrity: changes in formula feeds or surgical procedures lead to chronic stooling and diarrhea. This also results in changes in intestinal microbiota and stool pH.
- Breastfeeding has been proven to be a protective factor since the stool from these infants has a lower pH.
- Frequency of diaper changes: prolonged contact with irritants such as urine and feces increases the risk of skin inflammation. Newborns and young infants whose diapers are changed more frequently tend to be less affected than older infants. Extreme prematurity often requires less frequent touch times increasing the risk for contact irritation.

Infection

In the setting of contact irritant dermatitis, infection may also develop in the injured skin further exacerbating the condition.

Fungal infection, especially by *Candida albicans*, is the most common infectious cause. Candida infection can be a primary cause of diaper dermatitis and can also result as a superimposed infection to chronic irritation.

In these situations, normal dermatitis interventions typically fail to show effective resolution of the skin condition.

Infection

Bacterial infections follow fungal infections as the second most common cause of infectious diaper dermatitis.

Staphylococcus aureus infection can occur in newborns, secondary to colonization from the umbilical cord.

Streptococcus pyogenes (Group A Strep) is also seen as an etiologic agent causing the condition.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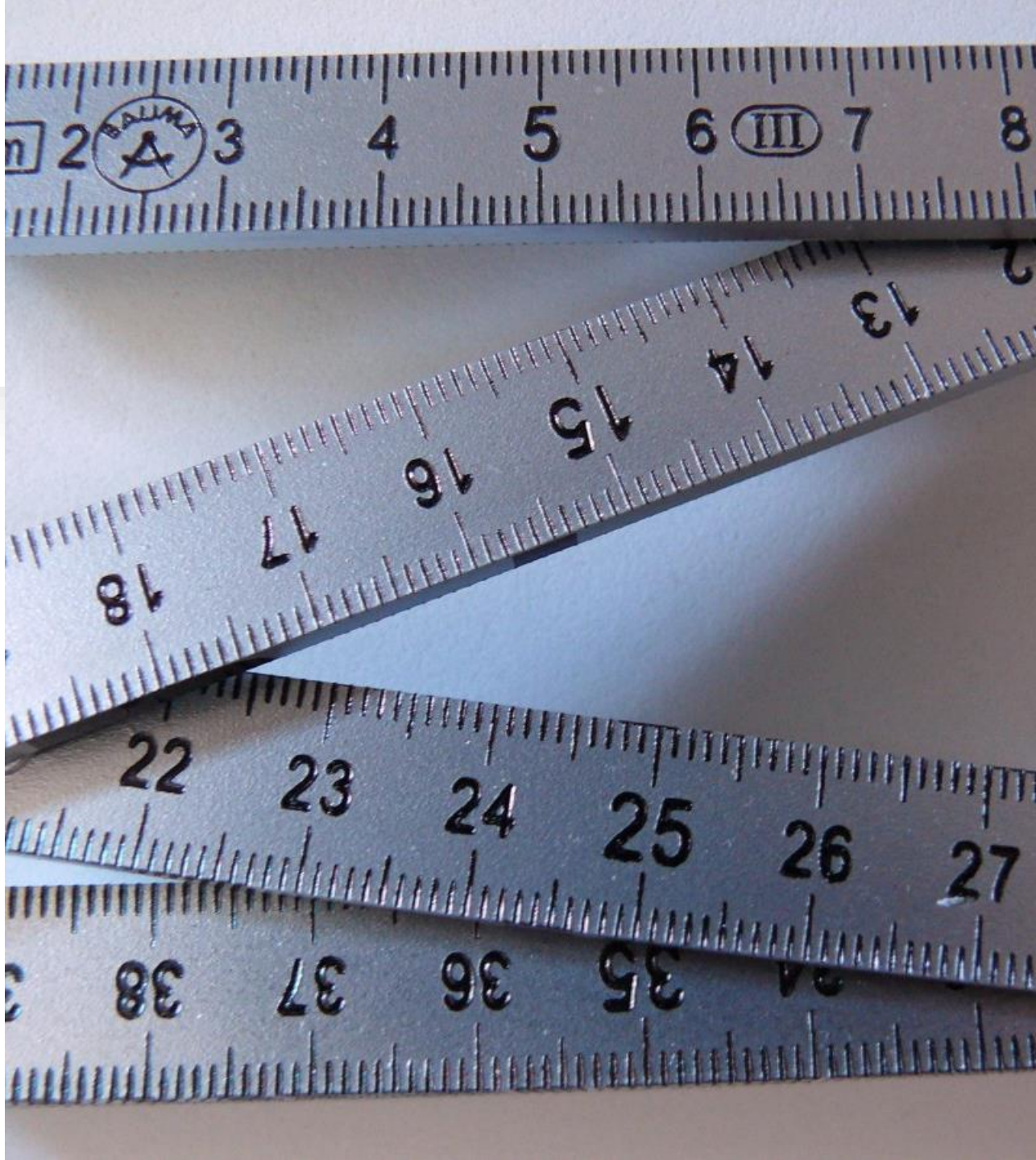
Classification and Assessment

- Scales to assess and classify diaper dermatitis in premature infants and neonates are scarce and often subjective to the particular hospital and NICU.
- Nonetheless, guidelines to help individual units to manage diaper dermatitis are recommended to improve compliance and avoid random treatment by NICU staff.
- Three guidelines are presented as an illustration to help guide your own assessment tool.



Clinical Evaluation Guideline - Brown *et al.*

Score	Degree	Definition
0	None	Skin is clear. No erythema
0.5	Slight	Faint to definite pink in a very small area (<2%)
1	Mild	Faint to definite pink in a small area (2-10%) or definite redness in a very small area (<2%)
1.5	Mild/Mod	Faint to definite pink in a large area (10%) or definite redness in a small area (2-10%)
2	Mod	Definite redness in a larger area (10-50%) or very intense redness in a very small area (<2%), may have slight desquamation or edema.
2.5	Mod/Severe	Definite redness in a very large area (>50%) or very intense redness in a small area (2-10%) without edema; moderate desquamation and/or edema.
3	Severe	Very intense redness in a larger area (>10%) and /or severe desquamation, severe edema, erosion and ulceration; large areas of confluent papules, pustules or vesicles.

Brown WM et al. A clinical study to evaluate the efficacy of two marketed zinc oxide-based diaper rash ointments in children with diaper dermatitis. Clinical Dermatology Conference -2006. Reproduced by Ciprandi 2022.

Scoring system too complicated.
Degree classification vague – mild/mod, mod/severe
Subjective – “Very” small, “very” intense redness, “slight” desquamation, “2%”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MEDLINE
cm 1 2 3 4 5 6
TTON TIPPED APPLICATORS
PLICATEUR À POINTE DE COTON
LICADOR CON PUNTA DE ALGODÓN
WOOD SHAFT | 15.24 CM TIGE EN BOIS | 15.24 CM VARILLA DE MADERA
APPLICATORS | APPLICATEUR | APLICADOR


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APPLICATORS

Scoring System - Buckley

A. Severity of Erythema & Irritation	**None –** Clear skin **Mild –** Some irritation detectable **Moderate –** irritation obvious but not severe or intense **Severe** – Intense skin irritation, bright red	0 1 2 3
B. Extent of Diaper Dermatitis	<50% of diaper area affected >50% of diaper area affected	0 1
C. Papules and Pustules	Present, countable Present, too numerous to count	0 1
D. Open skin	Superficial, limited to epidermis Deep dermal/subdermal wound	0 1
Total Score A+B+C+D		

Buckly BS. A new scale for assessing the severity of uncomplicated diaper dermatitis in infants: Development and Validation. Pediatr Dermatol 2016;33(6) 632-639.

Clear categories.
Simple scoring system.
Total score does not really apply to bedside nurse intervention/treatment


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APPLICATORS | APPLICATEUR | APLICADOR


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APPLICATORS

GLOBIAD

Ghent Global IAD Categorisation Tool

Category 1: Persistent redness

1A - Persistent redness without clinical signs of infection

Critical criterion

- Persistent redness
  A variety of tones of redness may be present.
  Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.

Additional criteria

- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

1A

1B - Persistent redness with clinical signs of infection

Critical criteria

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.
- Signs of infection
  Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection).

Additional criteria

- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- The skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

1B

Category 2: Skin loss

2A - Skin loss without clinical signs of infection

Critical criterion

- Skin loss
  Skin loss may present as skin erosion (may result from damaged/eroded vesicles or bullae), denudation or excoriation.
  The skin damage pattern may be diffuse.

Additional criteria

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

2A

2B - Skin loss with clinical signs of infection

Critical criteria

- Skin loss
  Skin loss may present as skin erosion (may result from damaged/eroded vesicles or bullae), denudation or excoriation.
  The skin damage pattern may be diffuse.
- Signs of infection
  Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection), slough visible in the wound bed (yellow/brown/greyish), green appearance within the wound bed (suggesting a bacterial infection with Pseudomonas aeruginosa), excessive exudate levels, purulent exudate (pus) or a shiny appearance of the wound bed.

Additional criteria

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

2B

SKINT skin integrity research group
www.skintghent.com

Beeckman D, Van den Bussche K, Alves P, Beele H, Ciprandi G, Coyer F, de Groot T, De Meyer D, Dunk AM, Fourie A, García-Molina P, Gray M, Iblasi A, Jelnes R, Johansen E, Karadağ A, LeBlanc K, Kis Dadara Z, Long MA, Meaume S, Pokorna A, Romanelli M, Ruppert S, Schoonhoven L, Smet S, Smith C, Steininger A, Stockmayr M, Van Damme N, Voegeli D, Van Hecke A, Verhaeghe S, Woo K & Kottner J. The Ghent Global IAD Categorisation Tool (GLOBIAD). Skin Integrity Research Group- Ghent University 2017.

University Centre for Nursing and Midwifery | GHENT UNIVERSITY

No Infection

Infection

Intact Skin

Open wound

CATEGORY 1: PERSISTENT REDNESS

Category 1A: Persistent redness without clinical signs of infection

Critical criterion

Persistent redness
A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.

Additional criteria

- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

Category 1B: Persistent redness with clinical signs of infection

Critical criteria

Persistent redness
A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.

Signs of infection
Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection).

Additional criteria

- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

Define “persistent” – days, weeks?
- after treatment?

Persistent redness despite treatment automatically suggests *infection?*

CATEGORY 2: SKIN LOSS

Category 2A: Skin loss without clinical signs of infection

Critical criterion

Skin loss
Skin loss may present as skin erosion (may result from damaged/eroded vesicles or bullae), denudation or excoriation. The skin damage pattern may be diffuse.

Additional criteria

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

Category 2B: Skin loss with clinical signs of infection

Critical criteria

Skin loss
Skin loss may present as skin erosion (may result from damaged/eroded vesicles or bullae), denudation or excoriation. The skin damage pattern may be diffuse.

Signs of infection
Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection), slough visible in the wound bed (yellow/brown/greyish), green appearance within the wound bed (suggesting a bacterial infection with Pseudomonas aeruginosa), excessive exudate levels, purulent exudate (pus) or a shiny appearance of the wound bed.

Additional criteria

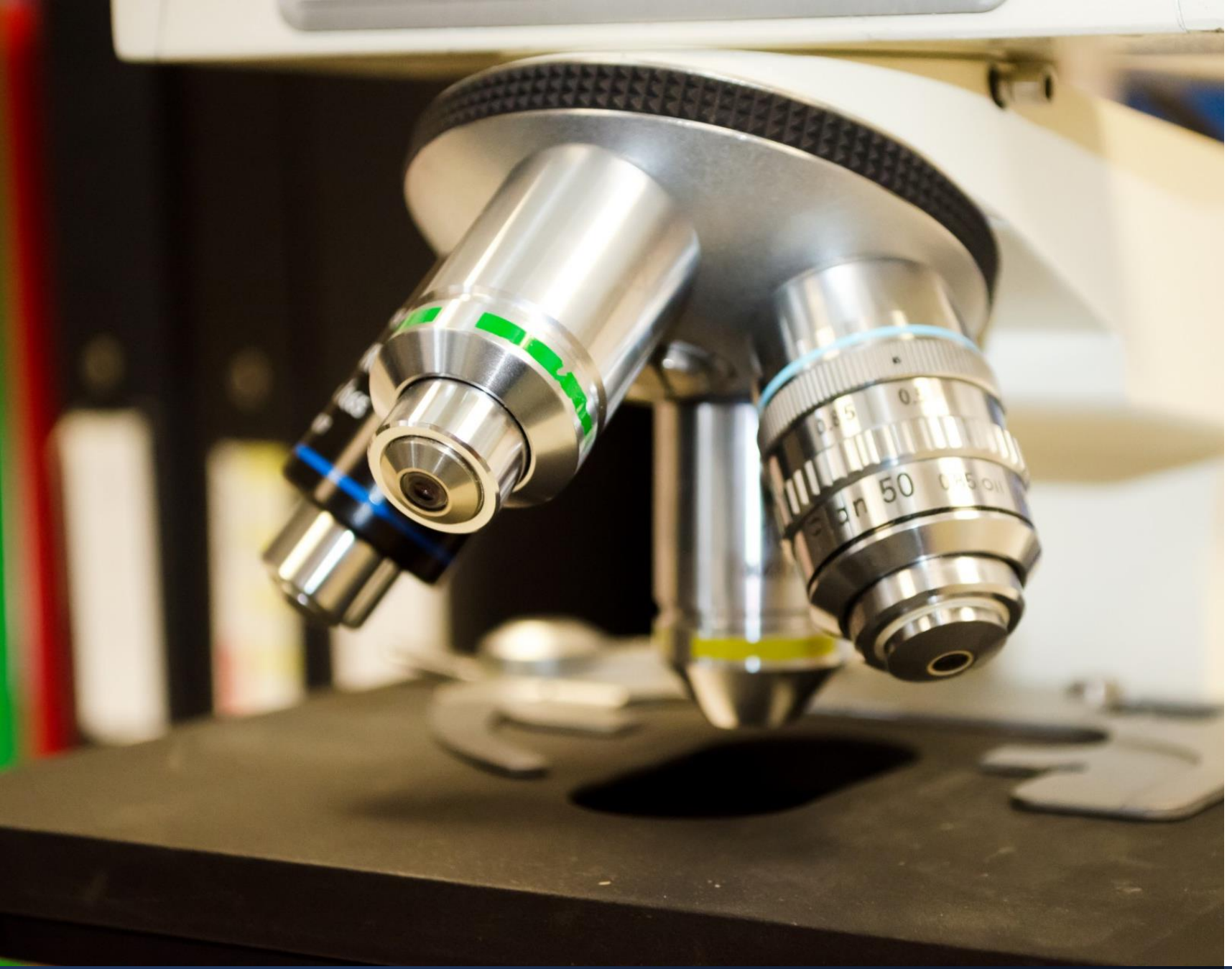
- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

Simple – Infection vs. No infection

Simple – Open wound present

Ideal Assessment Tool Components

- Intact skin or open wounds
- Presence of infection – yes/no
- Size of the affected area - >50%, < 50%
- Severity of erythema and irritation – none, mild, moderate, or severe



Laboratory Assessment

- The role of laboratory testing to assess for an etiology is limited to situations where infection is suspected.
- In these cases, or when the patient has responded poorly to routine care, simple tests to consider would include:
  - Bacterial culture swab – will typically identify both bacterial and fungal etiologies
  - HSV PCR

Clinical Presentation

Clinical presentation can be variable. Skin findings include erythema, papules, scaling, and erosions that can be present around the thighs, scrotum, suprapubic area, and buttocks.






Approach to Treatment and Management

Barrier Products

Wound Products

Barrier Products

- The use of a topical barrier is recommended for both prevention and treatment. They can improve the skin barrier function, and they also provide a barrier between the skin and the diaper, urine, and feces.
- Pastes and ointments generally are better barriers than creams and lotions, which are poorly adherent, minimally occlusive and may contain fragrances and preservatives.
- The most common over the counter topical barriers contain petrolatum, zinc oxide or both. Some also contain lanolin, paraffin or dimethicone (silicone).

Zinc Oxide and Petrolatum

Zinc oxide and petrolatum are both common ingredients in diaper rash creams, but they serve different purposes:

Zinc Oxide:

Zinc Oxide is an active ingredient in many diaper creams. It acts as a barrier on the skin, creating a protective layer that helps prevent further irritation from wetness and friction.

It has mild astringent properties, which can help soothe and dry out the rash.

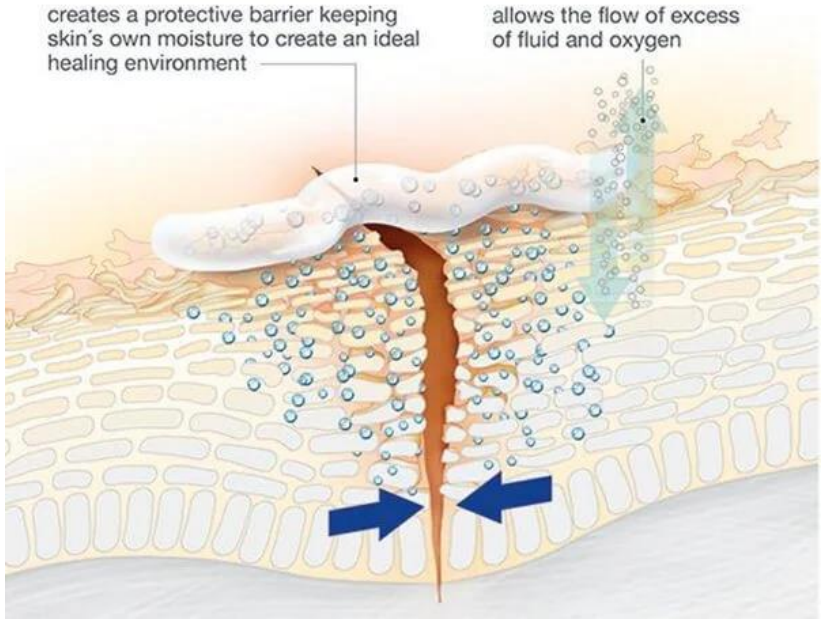
It is effective for treating and preventing diaper rash, especially when it is associated from moisture and irritation.

Petrolatum

Petrolatum, often referred to as petroleum jelly (aka Vaseline), is an occlusive agent. It works by sealing in moisture and creating a barrier on the skin.

While petrolatum can help protect the skin from further irritation, it doesn't have the same mild astringent.

It is often used in diaper rash creams as a base or inactive ingredient to keep the skin moisturized and maintain the cream's consistency.

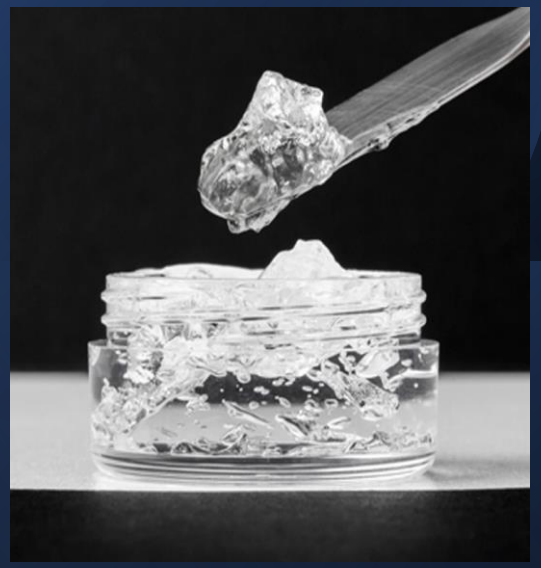


Zinc Oxide and Petrolatum

In many cases, diaper rash creams will contain a combination of both zinc oxide and petrolatum, along with other soothing and healing components. The choice between them depends on the specific needs of the patient’s skin.

Zinc oxide is typically ideal when dealing with a rash, while petrolatum can be used for protection and to maintain moisture balance in the skin.

Dimethicone



Dimethicone, a silicone-based compound, can offer several advantages when used in diaper rash creams:

1. Barrier protection: Dimethicone also creates a protective barrier on the skin, creating a shield against moisture and irritants.
2. Moisture: Unlike zinc oxide, dimethicone locks in existing moisture, preventing excessive drying of the skin. This can be beneficial and an additive effect when combined as a barrier.
3. Soothing properties: It has a soothing effect on irritated skin. It can alleviate discomfort and promote the healing process.
4. Non-irritating: Dimethicone is non-irritating and safe for most skin types including neonates.
5. Dimethicone creams are often smoother and easier to apply.
6. Compatibility: It can be combined with other agents to enhance the efficacy of a product.

Barrier Ointment Comparisons

Brand Name	Active Ingredient	Inactive Ingredient
Desitin Daily Defense Cream	Zinc Oxide 13%	Petrolatum, Dimethicone, Mineral Oil
Desitin Maximum	Zinc Oxide 40%	Petrolatum, Lanolin, Cod Liver Oil**
Boudreux's Butt Paste Original	Zinc Oxide 16%	Petrolatum, Castor Seed Oil*, Mineral Oil
Boudreux's Butt Paste Maximum	Zinc Oxide 40%	Petrolatum, Castor Seed Oil, Mineral Oil
Aquaphor	Petrolatum 41%	Panthenol, Glycerin
Remedy Z Guard	Zinc Oxide 17%	Petrolatum 57%,
Remedy Hydraguard	Silicone blend 24%	safflower oil*, multiple other proprietary
3M Cavilon Skin Barrier Cream	Dimethicone	Coconut Oil, multiple other components
Triad Paste	Zinc, Petrolatum, Dimethicone***	

* anti-inflammatory, anti-infective
** anti-oxidant
*** proprietary concentrations

Skin Barrier - Films/Liquid Skin Protectants

Skin Barrier Films/Liquid Skin Protectants

- These products are designed to provide a protective layer on the skin, forming a barrier that can help prevent skin damage, particularly in situations where the skin is at risk of irritation, friction, moisture or exposure to irritants.
- They are available in various forms, including liquid, spray or wipe and are applied topically to create a barrier that helps maintain skin integrity and prevent skin breakdown.

3M Cavilon Advanced Skin Protectant

Cavilon advanced skin protectant is a liquid polymer that forms a durable, breathable, and waterproof barrier on the skin and is designed to protect the skin from moisture and irritants, such as feces, urine, wound drainage, and digestive fluids. It is especially useful for people who suffer from diaper dermatitis.

It is a liquid that dries quickly to form a transparent, durable, and breathable film barrier on the skin. It adheres to both intact and damaged skin and can resist washing off or rubbing off. It does not need to be removed, as it will wear off naturally over time.

It does not sting upon application.

It can be applied on intact or damaged skin and can last up to seven days or more.

3M Cavilon No Sting Barrier Film

Cavilon No Sting Barrier Film is a polymer-based alcohol-free barrier film that helps prevent skin damage. It forms a sting-free, waterproof, protective coating that is breathable and transparent, allowing for continuous visualization and monitoring of skin.

It is fast-drying, sterile (wands and wipes only), and compatible with chlorhexidine gluconate (CHG).

It is non-cytotoxic and hypoallergenic and can be used on both intact and damaged skin. It also provides clinically-proven protection against incontinence-associated dermatitis (IAD).

It is intended for individuals with sensitive or fragile skin and is used to provide a protective barrier without causing discomfort or stinging upon application.

Comparing the 3M Products

While both Cavilon Advanced Skin Protectant and Cavilon No Sting Barrier Film offer skin protection, the key differences lie in their specific formulations and target user populations. Much can also be said regarding the when each product was distributed. Cavilon Advanced is the latest product from 3M.

The Advanced formulation provides durable protection against bodily fluids and is resistant to washing, whereas the “No Sting” version was marketed for individuals with sensitive or fragile skin.

3M representative support the use of the Advanced version for diaper dermatitis but recognize literature specifically addressing safety and efficacy in neonatal and premature population is lacking. 3M reports Advanced has no components that would cause pain with application.

Marathon Cyanoacrylate Liquid Skin Protectant

Marathon is a liquid skin protectant that dries on and adheres to the skin, protecting it for several days after application.

The traditional use of cyanoacrylate was as a medical adhesive for open wounds.

There has been a significant amount of documented evidence demonstrating the usefulness of the cyanoacrylate skin protectant in the treatment and prevention of moisture associated skin damage and mechanical associated skin damage in adults and infants.

It is indicated for use to help protect skin exposed to irritation and moisture such as urine, feces, digestive juices, perspiration and wound drainage.

When used appropriately, it has shown to be effective for diaper dermatitis in neonates.

Barriers are important but what about the wound?

Diaper Dermatitis – Focus on the Wound

- Whereas protecting the injured skin from additional moisture and irritants is important, such interventions have minimal or passive impact on the actual wound itself.
- Correcting the alkaline pH of the skin and reducing the infectious burden of the tissue will also play a significant role in healing the open wound and reducing the inflammation present.

VASHE wound solution

- A wound cleanser with disinfectant properties
- Contains pure Hypochlorous Acid (no burning or stinging sensation)
- Can be used on acute and chronic wounds, dermal lesions, stage I-IV pressure injuries, diabetic ulcers, post-surgical wounds, burns, abrasions.
- No clinical contraindications for use
- Safe and effective for neonates (>23 weeks)
- Produced by a proprietary electrochemical process, ensuring a pH no greater than 5.5, the same pH level as healthy, healing skin

The Importance of pH

- Wound healing is optimal in slightly acidic environments where antimicrobial properties are higher.
- Many cleansing solutions contain toxic ingredients, such as sodium hypochlorite, and have a highly alkaline pH.
- An alkaline environment created by stool and urine can allow pathogens to thrive, promote skin breakdown and potentially impede the healing process.
- By applying hypochlorous acid onto the affected skin, you lowering the pH into a range of 4-6 similar to intact human skin. As a result, the lower pH eliminates cytotoxicity and confers sporicidal activity.

Efficacy of Pure Hypochlorous Acid (pHA) Preserved Solution in the Treatment of Severe Perianal Contact Dermatitis in Infants

Rene Amaya, MD, FAAP, CWSP
Pediatrix Medical Group - Houston

Introduction

Premature infants in the neonatal intensive care unit (NICU) often suffer from severe perianal contact dermatitis (PCD). Multiple factors increase the risk for these painful wounds include the immaturity of the skin, caustic nature of the stool, alkaline breakdown products of urine, and secondary bacterial and fungal infections of the skin. Treatment of PCD in NICU patients has focused on application of various barrier products to protect the skin from ongoing irritation. The author sought to determine if in addition to traditional treatment, focusing on treatment of the wound itself might expedite healing.

Pure Hypochlorous acid (pHA) preserved wound cleanser solution has been shown to be effective towards reduction of bioburden of wound beds[1]. pHA also disrupts microbial colonies[2] and has a pH range aligned with the pH of the skin which helps in healing[3].

In this case series, infants with severe PCD were treated with a single daily application of pHA in combination with traditional barrier ointments and dressings. The goal was to determine if pHA might synergistically expedite PCD healing.

Methods

Ten infants in the NICU with severe PCD who had shown poor response to various topical barrier ointments and dressings were recruited. Gauze dressings were saturated with pHA solution, applied to directly to the affected skin, and left in place for 5-10 minutes. Thereafter, barrier ointment was reapplied to the site. The pHA was applied once daily for 7 days. Routine diaper changes and skin hygiene continued as usual. Photographs were taken for objective assessment and documentation.

Patient Characteristics

Patient #	Gestational Age	Chronological Age	Sex	Duration of condition prior to treatment	Percentage Resolution after 7 days treatment
1	25 weeks	5 months	Female	7 days	100%
2	23 weeks	4 months	Female	8 days	100%
3	25 weeks	16 days	Female	7 days	100%
4	38 weeks	2 months	Male	7 days	100%
5	23 weeks	20 days	Female	8 days	100%
6	23 weeks	4 months	Female	4 days	100%
7	34 weeks	14 days	Female	6 days	100%
8	38 weeks	1 month	Male	7 days	100%
9	23 weeks	1 month	Female	8 days	100%
10	25 weeks	5 months	Female	5 days	75%

Illustrative Cases

Case 1

5 m/o 25-week premature female with history of intestinal perforation and bowel resection. Poor response to cyanoacrylate and zinc barrier. Open wounds resolved after 7 days pf treatment protocol.

Case 2

4 m/o 23-week premature female with recent cardiac-related surgery. Reduced direct care nursing intervention due to cardiac decompensation. Poor response to Questran/Aquaphor. Skin improved after 7 days treatment protocol and improved diaper hygiene.

Case 3

16 d/o 25-week premature female. Poor response to zinc oxide preparation. Open wounds healed after 7 days of treatment protocol.

Results

Regardless of the barrier ointment utilized, 90% of the infants showed complete resolution of the open wounds and inflammation after 7 days.

One infant reached this goal after treatment was extended for 14 days. In every case, patients exhibited no signs of complications from topical application of pHA to the skin.

Conclusions

This case series illustrates the synergistic benefits of utilizing pHA wound cleaner in healing severe PCD in combination with traditional application of barrier ointments and dressings. The simple intervention was purposely designed to improve nursing compliance and monitor the effects of single daily applications. The addition of pHA expedited healing in patients who were unresponsive to traditional methods alone.

In addition to the findings above, the small study illustrated the positive effects of focusing on basic skin care and diaper hygiene in NICU patients. Such simple routine interventions might prevent contact dermatitis from arising and avoid secondary pain and stress in these fragile patients.

Larger studies are planned to ensure the observed results are reproducible.

References:

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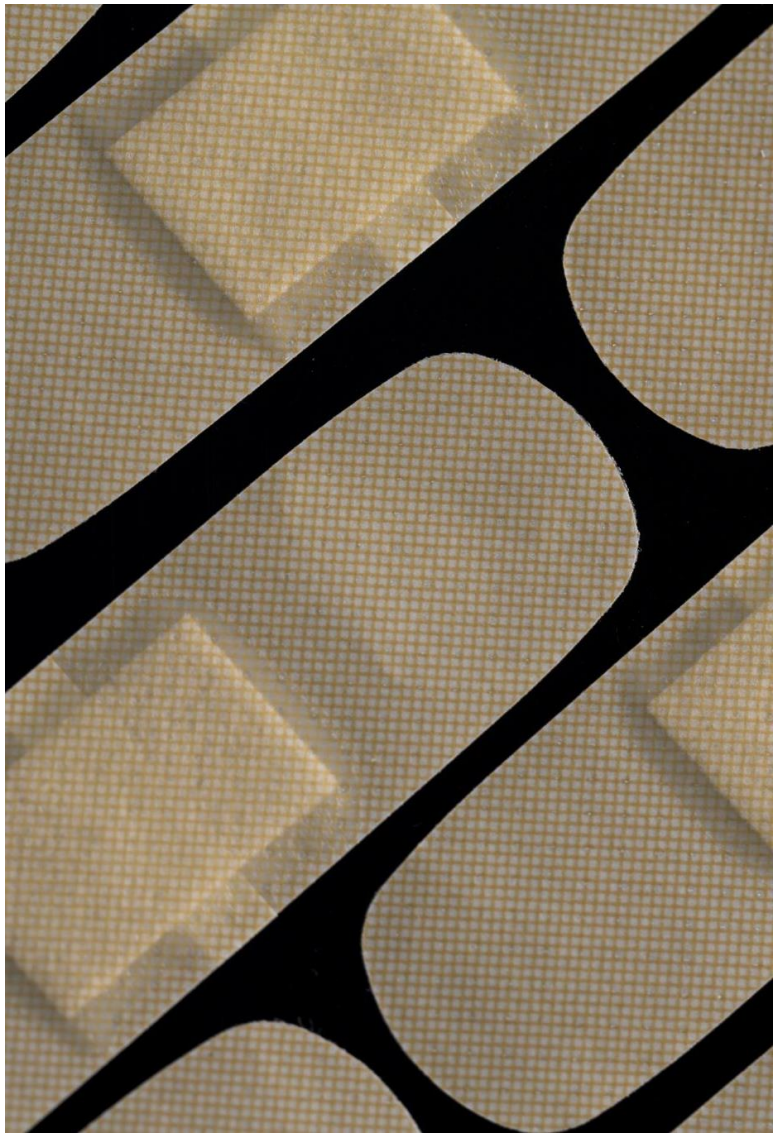
Vashe, Urgo Medical

An Approach Towards Preventing and Treating Diaper Dermatitis



Treatment Strategies

- A reasonable strategy to address diaper dermatitis is to categorize the infant's condition based on the physical examination findings
  - How severe is the current problem?
  - Skin intact and minimally erythematous?
  - Any denuded skin? Total Size? >50%?
  - Deep dermal wounds with bleeding?
  - Signs of infection?
- Each facility should create a tiered approach based on the severity of the skin which will promote a consistent treatment pattern among all the staff and avoid ambiguity and potentially antagonistic interventions.
- Choice of product should consider cost, ease of application, ease of removal, availability on formulary.

Treatment Strategies

Mild Skin Findings

Faintly Erythematous, Intact Skin, No Signs of infection

Treatment Options

<u>Simple Barriers</u>

Petrolatum Based - Zinc Oxide - Cavilon Film Barriers

Treatment Strategies

Moderate Skin Findings

Poor response to initial intervention, increased erythema, increased size, denuded skin

Treatment Options

✅ Change Barrier

Petrolatum Based - Zinc Oxide - Cavilon Film Barriers

✅ Add Hypochlorous Acid

Treatment Strategies

Severe Skin Findings

Poor response to secondary intervention, increased erythema, increased size, open wounds, bleeding

Treatment Options

Combine Barriers

✅ Petrolatum Based - Zinc Oxide - Cavilon Film Barriers

Compounded Barriers*

✅ Increase frequency of topical Hypochlorous Acid

✅ Allow periods of air drying

✅ Empirically Begin Systemic Antifungal (Oral/IV Diflucan)

Miscellaneous

The use of wet wipes has been controversial over the years, mainly due to the concern that the components could cause further irritation to the skin. Many units utilize dry wipes moistened with warm saline or sterile water.

However, recent studies have shown that newer formulations of baby wipes do not cause any harm to the skin.

The newer formulations of wipes include pH buffers help to balance the alkaline pH of the urine and prevent skin damage due to pH changes. It is important to advise parents that the wipes should be free of soap, essential oils, or other fragrances and harsh detergents that can be irritant to the skin.

Summary

- Key factors that predispose to skin damage in diaper dermatitis include excess moisture, friction, elevated pH and high enzymatic activity
- Secondary infection is a frequent component of diaper dermatitis and intervention to prevent and treat fungal or bacterial infections should be strongly considered.
- Each hospital should design a means to classify the various stages of diaper dermatitis so as to create a uniform approach towards treatment.
- Multiple barrier products are available based on common components. Hospitals should consider carrying more than one option for as the severity of the skin trauma worsens.
- Topical application of hypochlorous acid facilitates normalization of skin pH and reduces infectious bioburden. It’s use in diaper dermatitis should strongly be considered.
- A tiered approach to treatment of diaper dermatitis is highly recommended based on the severity of the skin trauma observed.

Thank you!

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