

Managing Diaper Dermatitis

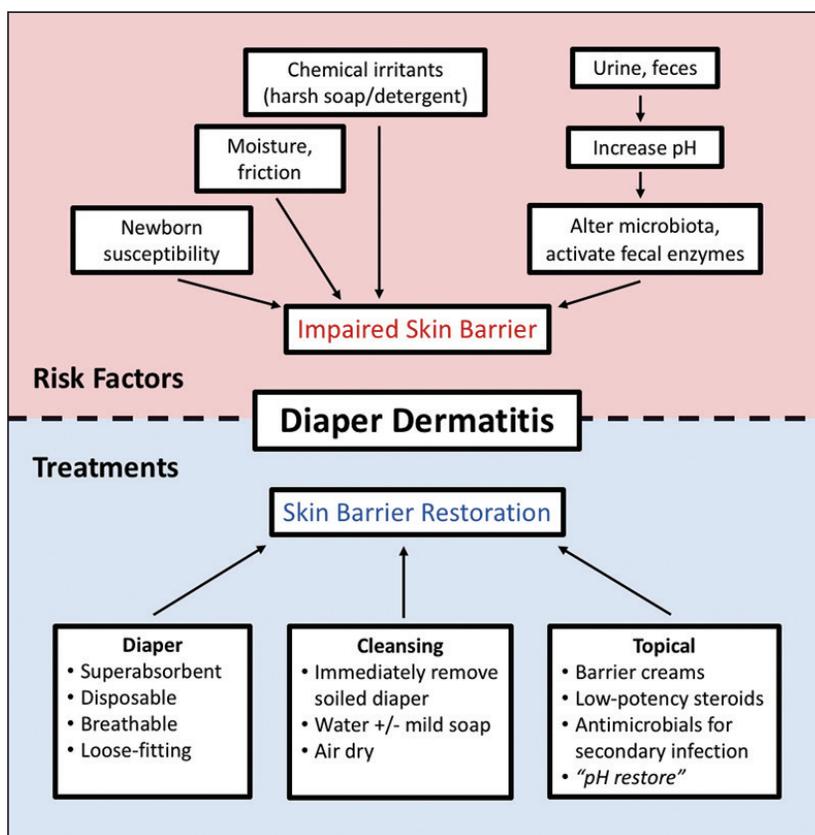
First-line treatment tips and a review of when to assess for an alternate diagnosis.

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Diaper dermatitis (DD) is the most common skin condition in infancy¹ with an estimated 50-65 percent of infants having had at least one occurrence.²⁻⁴ DD has no race or gender predilection³ and incidence peaks between nine and 24 months of age.^{2,5,6} Most cases are mild, last for two to three days per episode,⁶ and are typically managed by pediatricians and family physicians. Although the term “diaper dermatitis” loosely refers to any type of dermatitis in the diaper area, it has traditionally been used to refer to an irritant dermatitis. Irritant DD occurs on the convex surfaces of the groin that contact the diaper and classically spares the skin folds.¹ This condition can range from mild disease with asymptomatic erythematous papules to severe disease presenting with painful eroded plaques and punched-out erosions, i.e., Jacquet’s erosive diaper dermatitis.¹ DD resolves when the patient no longer uses diapers and is fully toilet trained.¹ Severe or refractory cases should be further evaluated for secondary or alternate diagnoses, including infections, nutritional deficiency, seborrheic dermatitis, psoriasis, Langerhans cell histiocytosis, and child abuse.¹

MULTIFACTORIAL ETIOLOGY

DD is a multifactorial condition involving impairment of the skin barrier leading to irritant contact dermatitis (Fig. 1).^{1,7-9} Newborn skin, particularly in the diaper area, is more susceptible to skin barrier disruption compared to more mature skin.¹⁰ Causative factors include excessive moisture (e.g., from incomplete drying or perspiration), friction, and



exposure, to caustic substances, such as urine and feces.¹ Friction and excessive moisture even without urine or feces breaks down the stratum corneum and increases permeability to potential irritants.^{8,11} Urine increases moisture and raises pH. Urine pH ranges from 4.6 to 8; however, the pH increases when urine urea is broken down by fecal urease.¹² Fecal pH is 6.5 to 7.5 and normal buttock skin pH is 5.5.^{13,14} Alkaline pH changes the microbial colonization and activates fecal enzymes to degrade the stratum corneum.¹⁵ Severity of DD has been correlated with elevated pH in the

diaper area.^{13,16} DD has also been correlated with frequency and consistency of bowel movements with risk factors including viral gastroenteritis, constipation with fecal incontinence, underlying gastrointestinal disorders, and dietary changes.^{2,5} Breastfeeding has been shown to be protective for moderate to severe DD, possibly due to the significantly lower pH of feces from exclusively breastfed infants with less enzymatic activity.^{5,17-19}

MULTI-FACETED TREATMENT APPROACH

As irritant DD has a multifactorial etiology, a multifaceted treatment approach addressing the various risk factors can be beneficial (Fig. 1). The first step is to obtain a detailed history including bathing and cleansing routines, product ingredient review, frequency and description of urination and defecation, and diet.¹ The development of superabsorbent, disposable, and breathable diapers instead of cloth diapers has greatly decreased the incidence and severity of DD;^{11,20-22} however, soiled diapers should still be removed as soon as possible.¹ Diapers should be loosely fitting.¹ Excessive scrubbing and use of alcohol wipes should be avoided.

When using a disposable diaper, the genital area does not need to be cleansed with a detergent/soap after urination. A water rinse followed by a short air-dry period prior to replacing the diaper is recommended. Following fecal exposure, the area can be cleansed with a gentle water rinse, mild soap, and patted dry. Pre-moistened wipes have been shown to be as mild as water;²³ however, a significant number of available wipes contain preservative and fragrance chemicals that can irritate and potentially cause contact sensitization, and therefore should not be used on broken skin.^{1,24}

Restoration of the acid mantle (pH restore) with acidification sprays, soaks, or pH buffers in baby wipes may assist in reversing the alkaline pH.^{8,25} These soaks and sprays are formulated by adding a tincture of white or apple cider vinegar to a water bath or spray bottle (~1:100). The pH restore solution can be used with every diaper change and does not need to be rinsed but should be patted dry and further allowed to air-dry if time permits. Liberal use of barrier creams such as zinc oxide and petrolatum create an occlusive layer, which aids in decreasing contact with irritants and decreasing transepidermal water loss (TEWL). Barrier creams can be reapplied with each diaper change and should be applied in a thick layer often likened to “frosting on a cake.”¹ Cornstarch powder absorbs moisture and reduces friction.¹ While talcum powder is a common ingredient in baby powders, cornstarch is considered to be a safer alternative as it has not been previously associated with ovarian cancer or found to contain asbestos contamination.^{26,27} A new cream-to-powder product using corn

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starch and other natural ingredients is suggested to be safe and effective for preventing DD.²⁸

In more severe conditions, additional treatments may be necessary. If there are erosions, mineral oil can be used to soften and gently remove dried feces.¹ Wet compresses (with water or pH restore solution) may be used prior to medications and barrier creams if exudate or crusting is noted.¹ Low-potency topical steroids may be used for short periods of time to calm inflammation.¹ If a stinging sensation is noted with bath water, addition of ¼ cup of salt or baking soda may minimize discomfort as well as reduce infection.^{1,29}

For secondary bacterial infections, topical antimicrobials are often prescribed. For candida infection, nystatin is the most commonly prescribed topical agent;³ however, other agents such as ketoconazole, can also be used. Refractory cases may require systemic treatment.¹ Decreased microbial colonization including methicillin-resistant *Staphylococcus aureus* (MRSA) can be achieved with dilute sodium hypochlorite (bleach) baths (e.g., 0.125-0.5 cups per full tub or one to two teaspoons of bleach per gallon of water) twice a week and mupirocin twice a day to nares for five days as a first step.^{30,31} Alternative decolonization protocols can be performed if needed and call for mupirocin application to additional body sites and at monthly intervals. While dilute bleach baths have antimicrobial activity³² and baking soda eases pain, they both increase the skin's pH. Thus, it is important to pH restore after these baths; the natural acidic milieu allows the healthy microbiota of the diaper area to thrive and produce innate antimicrobial agents against invasive pathogens.^{7,33}

PATIENT EDUCATION

Irritant DD is a common skin condition that can cause patient discomfort as well as caregiver anxiety. Parent education of the risk factors and multifactorial treatment approach is imperative for prevention and management. The mainstays of DD treatment include measures aimed at decreasing moisture, friction, pH, and contact with irritants. In severe and refractory cases, a variety of secondary and differential diagnoses can be considered. ■

(Continued on page 73)

(Continued from page 65)

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