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Diagnosis, Prevention and Management of Diaper (Napkin) Dermatitis

Bebek Bezi (Napkin) Dermatitinin Teşhis, Önlenme ve Tedavisi

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ABSTRACT

Diaper Dermatitis (DD) is the most common skin disease in infants and children, and may cause problems such as restless, pain and sleep disorders. Stress can also develop on parents and caregivers due to their child's restlessness and illness. It is important to know the clinical findings of DD and to treat the disease before it progresses. In this review, factors, clinical findings, diagnosis, complications, prevention measurement and new treatment methods in DD was evaluated. Alternative treatment methods and treatment strategies are being developed for DD as a result of advances in technology and medicine. Protective and preventive methods are the first approach strategy in DD, and we are of the opinion that providing training to parents before and after birth it will be effective.

Keywords: Diaper dermatitis; napkin dermatitis; barrier creams, neonatal; neonatal skin care

ÖZET

Bebek bezi dermatiti (BBD), infant ve çocuklarda en sık görülen cilt hastalığı olup, çocuklarda huzursuzluk, ağrı ve uyku bozuklukları gibi sorunlara neden olabilir. Çocuğun huzursuzluğu ve hastalığı nedeniyle ebeveynler ve bakıcılar üzerinde stres gelişebilir. Bebek bezi dermatitinin klinik bulgularının bilinmesi ve hastalığın ilerlemeden tedavi edilmesi önemlidir. Bu derlemede BBD'de etki eden faktörler, klinik bulgular, tanı, komplikasyonlar, korunma ölçütleri ve yeni tedavi yöntemleri değerlendirilmiştir. Teknoloji ve tıptaki gelişmeler sonucunda BBD için alternatif tedavi yöntemleri ve tedavi stratejileri geliştirilmektedir. Koruyucu ve önleyici yöntemler BBD'de ilk yaklaşım stratejisi olup, ebeveynlere doğum öncesi ve doğum sonrası eğitim verilmesinin etkili olacağını düşünmekteyiz.

Anahtar Kelimeler: Bebek bezi dermatiti; napkin dermatiti, bariyer kremler, yenidoğan; yenidoğan cilt bakımı

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1.Background

Napkin or diaper dermatitis (DD) is the most common skin disease of the infant and neonates which develops in inguinal, genital, gluteal and lower abdominal area under the diaper due to the various factors (1). The global incidence of DD, which is more common in 9-12 month age period, varies between 7-60% (1,2). The prevalence of DD is not known exactly, since not all parents consider DD is a disease and most of patients were treated at home by their parents and caregivers (3).

In addition to pain and restless in infants and children due to DD, it predisposes to seconder infectious by prolonged dermatitis. While the resulting dermatitis causes restless and pain in infants and children, the long-term presence of dermatitis also paves the way for secondary infection. These infections cause prolong the length of hospital stay and increase in health expenditures (4,5). Conditions such as excessive crying attacks, restlessness, irregularity and deterioration of sleep quality due to DD in infants can cause emotional stress in parents and caregivers (6).

In this review, we examined the factors, clinical findings, diagnosis, complications, prevention measurement and new treatment methods in DD. Few studies have been conducted on DD in recent years. Therefore, we aimed to present the current information based on DD by reviewing the literature.

2.Causative Factors

Diaper dermatitis occurs because of the interaction of the many factors. Inflammation and irritation caused by the damage of the Stratum corneum (SC) of the skin because of increase of moisture, pH, temperature, prolonged contact of the feces and urine play role in the development of DD (1,4).

2.1.Inappropriate skin care

Infant/neonate's skin has a quite sensitive than an adult's skin due to the immature structure of the SC, higher absorption of the skin and incomplete development of the barrier function (7,8). Since the care of the newborns is dependent on an adult person, parents/caregivers need to take care of infant's skin properly (1,2,4). The use of irritant substances such as liquid soap, alcohol, perfumed wipes or powder that will disrupt the skin pH, not choosing suitable diapers according to the baby's weight, and not changing the diaper at a certain frequency is among the wrong care mistakes made in skin cleaning (1,4,9).

2.2.Wetness and Moisture

The extremely moist environment caused by insufficient ventilation of the skin in the diaper increases the permeability by affecting the barrier function of the skin in SC. This situation causing erythema and dermatitis on the skin by changing of the protective balance, as well as leading to secondary infections facilitating the penetration of microorganisms into the skin (10).

2.3.Friction

The friction between diaper and skin plays crucial role in the development of the DD in the gluteal, genital and lower abdomen which are the skin areas that come into contact with the diaper the most. When the friction factor and the increase in moisture and temperature are combined, epidermal barrier function of the skin is damaged and skin integrity is impaired (11).

2.4.Urine and Stool

Ammonia which is released after the bacteria in the stool decomposes the urea, increases the pH of the stool. After the activation of the lipase and protease of the stool with this pH increased, erythema occurs, and skin integrity is impaired due to the contact of enzymes mentioned above with SC (1,2,9). Dermatitis in children/infants is increased with acute gastroenteritis (AGE). The moisture of the skin increases in parallel with the increase in stool volume and stool volume in AGE. In addition, the increase in the number of digestive enzymes in the stool together with the change in the permeability of the intestinal lumen is an influencing factor for DD (12,13).

2.5.Microorganisms

Microorganisms are not only effective factor in the development of DD but by facilitating the access of microorganisms from the damaged SC to the epidermis by the interaction of other factors, it causes the formation of secondary infections caused by fungi and bacteria. Candida infection is manifested by red plaques, papules and pustules and usually involves skin fold areas. Candidiasis is one the most common complications in children with DD plays more important role in the development of the DD compared to bacterial infections (14).

2.6.Antibiotic use

The use of broad-spectrum antibiotics in infants is among the factor that increase the risk of development of DD. The developing intestinal flora of neonate is negatively affected by use of these antibiotics and affects SC by causing changes in stool pH (13). As a result of these changes, C. albicans, an opportunistic pathogen, paves the way for colonization (15).

2.7.Diet and Allergen

The frequency of DD in breastfed infants was found to be lower than in infants with receiving formula. It reduces the possibility of skin irritation is decreasing due to stool pH and low enzyme activity in breastfeeding infants (16,17). It has been shown in studies that DD was increased in infants with food allergy, especially in those with cow's milk allergy (1,18-20).

3.Clinical Findings

Clinical findings in DD play an important role for diagnosis and treatment of DD at the early stage. DD starts with the skin dryness, erythema, mild maceration, and edema are seen in the early period, and dermatitis develops because of the spread of the lesion on the skin over time.

In severe stages, erosion and ulceration may develop in dermatitis areas and this situation creates a basis for colonisation to opportunistic pathogens. DD is mostly shown in the areas of the skin which are more in contact with urine/stool, lower abdomen, mons pubis, upper thighs and inner parts, labia major, scrotums. (1,2,11). While DD causes a serious increase in crying frequency, feeding and sleep disorders in infant, it also creates emotional stress for parents and caregivers (21). There are several scales available to determine the degree of DD, and scale of the Stamatas et al. is an easy-to-use that can be used in the diagnosis and grading of DD (Table 1) (21).

Table 1. Clinical Evaluation Scale for Characterization of the Severity of DD

Score	Degree	Definition
0	None	Skin is clear (may have very mild dryness and/or a single papule but no erythema)
0.5	Slight	Faint to definite pink in a very small area (<2%); may also have a single papule and/or slight dryness
1	Mild	Faint to definite pink in a larger area (10%) or definite redness in a small area (2%–10%) or very intense redness in a very small area (<2%) and/or scattered papules and/or slight dryness/scaling.
1.5	Mild/moderate	Faint to definite pink in a larger area (10%) or definite redness in a small area (2%–10%) or very intense redness in a very small area (<2%) and/or scattered papules (<10% area) and/or moderate dryness/scaling.
2	Moderate	Definite redness in a larger area (10%–50%) or very intense redness in a very small area (<2%) and/or single to several areas of papules (10-50 %) with five or fewer pustules, may have slight desquamation or edema.
2.5	Moderate/severe	Definite redness in a very large area (>50%) or very intense redness in a small area (2%–10%) without edema and/or larger areas (>50%) of multiple papules and/or pustules; may have moderate desquamation and/or edema.
3	Severe	Very intense redness in a larger area (>10%) and/or severe desquamation, severe edema, erosion and ulceration; may have large areas of confluent papules or numerous pustules/vesicles.

3.1.Differantial Diagnosis

Differential diagnosis in DD is important in terms of preventing unnecessary and inappropriate treatments. Especially in newborns, infantile seborrheic dermatitis should be differentiated from atopic dermatitis and infantile psoriasis. While the fold regions are also involved in these diseases, the fold regions are not involved in DD. Examination of other body parts also guides in distinguishing the diagnosis. It differs from classical DD by causing satellite pustular lesions when candidal intertrigo involves the gland area. In addition, streptococcal infection, cellulitis, scabies, allergic contact dermatitis should be differentiated from new-onset cases, and diseases such as granuloma gluteale infantum, Langerhans cell histiocytosis, biotinidase deficiency, acrodermatitis enteropathica should also be considered in the differential diagnosis in treatment-resistant cases (9,22).

4.Prevention and Treatment of the Diaper Dermatitis

Protective measures taken for the care and safety of children are valid in DD, prevention and protection is always the main approach strategy in DD (1,23). After it is formed, the aim of the treatment is to accelerate the healing of the damaged area and prevent its spread of the other parts of body (9,21). In this topic, an approach strategy that includes prevention, protection and treatment, which is known as ABCDE, has been determined for DD (1,24).

4.1.Non-pharmacological protection and treatment methods

A.Air

Airing the diaper area is a method that reduces the skin's contact time with irritants such as urine, stool and moisture, helps dry out moist areas of the skin and reduces friction in the skin areas contact with diaper (7,24). The diaper should be removed during the sleeping period in infants and after defecation and urinating in children in the play-age period, to ensure long-term ventilation of the skin areas (2,21,25).

B.Cleaning

The cleaning of the diaper area should be done gently with the help of warm water or wet wipes impregnated with water that do not contain perfume, alcohol and pollutants (26). In studies comparing alcohol-free wet wipes with and cotton in diaper area cleaning, no significant difference was found between the two groups in trans epidermal fluid loss, infection, erythema, skin moisture and pH levels (26,27). The skin in the diaper area should not be left wet after wiping, and the wipes should be dried by touching and pulling with small and gentle touches (2,28).

C.Diaper

The frequency and type of diaper change is a very effective factor on the development of dermatitis. In a study that included infants whose diapers were changed more than six times a day and infants whose diapers were

changed less than six times a day, the incidence of DD was found to be lower in the group with frequent diaper changes (17). The diaper should be tied in such a way that it does not touch the infant's skin too much, allowing the skin to get enough air, and should be chosen according to the weight of the infant if possible. (2,3). As a result of rapid developments in diaper technology in recent years, the frequency and severity of DD has decreased as a result of the production of disposable diapers containing highly absorbent gel materials (7).

D.Education

Educating families about DD about care and findings will increase parents' awareness of DD. The information conveyed to parents in a timely and accurate manner highlights the educational factor in providing hygiene for dermatitis. It should be explained that the cleaning should gently be done from front to back, avoid rubbing and wiping hard to remove barrier cream residues, if any, dry the area after cleaning the diaper area, apply a thick layer of barrier cream and change diapers frequently and wash their hands before and after every diaper change to parents/caregivers (3).

4.2.Pharmacological treatment

A.Barrier cream

Barrier creams widely used in development countries for the protection and primary care treatment of DD. The majority of the barrier creams are the effective compounds containing zinc-oxide and petroleum jelly (Vaseline), and they reduce the skin contact with irritants such as stool and urine and in this case, reduce moisture and form a barrier function (24,29). In a conducted study with Chinese infants, the low ratios of DD have been associated with a high incidence of prophylactic topical barrier cream use (30).

Zinc-oxide creams are the most active ingredient in barrier creams used for protection and treatment of DD. In addition to antioxidant, anti-inflammatory and anti-bacterial effect of topical zinc-oxide, it has also effective barrier function to irritants and friction of the skin (1,30,31).

Alonso et al. found the prophylactic use of petroleum jelly (Vaseline) creams is effective for prevention in DD (32). Since petroleum jelly (Vaseline) creams decrease the contact of skin with irritants such as stool and urine, and form a limiting lipid barrier, the development of infections and skin damage are prevented (7,30,32). Barrier creams needs to be rubbed the skin in a thick layer every change of diaper. Since it may damage the infant's skin, avoid trying to clean it completely, wipe it gently, and continue to use barrier cream after recovery to prevent dermatitis recurrences (2,7,12).

B.Topical corticosteroid creams

Topical creams containing low and medium potent steroids are effective treatment drugs used in the treatment of DD. In addition to the effectiveness of topical steroids, taking into account the high percutaneous absorption, it is necessary to plan twice a day, not exceeding the treatment dose for a maximum of 1 week (24, 25).

A.Topical antibiotics creams

The use of topical antibacterial and anti-fungal creams may be required within treatment protocol because of seconder bacterial/candida infections. It is not necessary and not recommended to routinely use antibacterial creams in the treatment of DD before the presence of bacteria is confirmed. In infections with proven bacteria in DD, topical antibiotics such as Mupirocin, Polysporin, Bacitracin can be added to the treatment to be used three times a day until the infected area is cleared (24,25).

Candida infections are one of the most common seconder complications in DD. In the presence of definitive fungal infection and DD that lasts longer than 72 hours, antifungal creams containing Miconazole, Clotrimazole, Ciclopirox, especially Nystatin, can be added to the treatment (22).

D.%2 Magnesium creams

Magnesium creams effective in DD treatments as anti-inflammatory, reducing pain relief and decreasing recovery time. In a study involving bathing with dead sea salts, Proksch et al. concluded that the reduction of skin hydration and redness is due to magnesium in the salty sea (33). In another study, the effect of cream containing 2% magnesium on the treatment of diaper dermatitis was investigated and it was supported by this study that 2% magnesium was effective in the treatment of DD (34).

4.3.Alternative Treatment methods in Diaper Dermatitis

In the literature, there are many studies using non-pharmacological methods in the treatment of DD. Olive oil is an easily available anti-inflammatory and antioxidant agent traditionally used for the topical treatment of diaper dermatitis. In a study, the effect of topical application of olive and calendula extract ointments on DD was compared and it was shown that olive oil can be as effective as calendula extract (35).

In addition to its antibacterial and anti-inflammatory effects, human milk is an effective treatment method used in the treatment of DD, due to its prebiotic, enzyme, hormone and growth factors (36,37). It has been shown that breast milk is as effective as barrier creams (16).

5.Conclusion

Owing to advances in technology and medicine, alternative treatment methods and treatment strategies are being developed for DD as a result of advances in technology and medicine. Protective and preventive methods are the first approach strategy in DD. Therefore, it will be effective to provide training to parents before and after birth.

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