



Etiopathogenics of Dermatitis in the Diaper Area

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Abstract

Background: Diaper area dermatitis is an acute inflammation, and the primary irritant type is the most prevalent type, which is caused by external factors such as wear and tear on the epidermis due to abrasions, heat, humidity, aggravated by prolonged skin contact with the diaper.

Objective: In this context, this article sought to gather scientific studies, according to specific criteria, focused on the etiopathogenesis and symptomatology of dermatitis in the diaper area.

Methods: Study on the etiopathogenesis of the disease in MEDLINE databases, via PubMed and SciELO, using the following descriptors: Dermatitis, diaper area, infection. Filters in three languages (Portuguese, English and Spanish) and were used publications with date between 2008-2019.

Results: There are opportunistic microorganisms residing in the genital flora, which are potential aggravating factors for this disease. Another problem is the self-treatment due to the belief that they are simple lesions, which brings the risk of delaying the differential diagnosis and the direction of the treatment carried out by the specialist, allowing the worsening of the condition, which can become systemic.

Limitations of the Study: This is a common disease, with a wide approach in the literature. We were able to verify some problems in the practical management in face of this involvement, and not in the study itself.

Conclusion: After analyzing the studies, it became clear that dermatitis in the diaper area is mainly related to a greater exposure of the individual's skin to pathological agents and maceration, which causes greater vulnerability in the region.

Keywords: Diaper area dermatitis; Dermatological etiopathogenesis

Introduction

Diaper area dermatitis is a very common syndrome that covers a set of inflammatory dermatoses which affect the entire region covered by the diaper, popularly known as diaper rash. It occurs mainly due to prolonged contact with

feces and urine, affecting most babies, but this dermatosis can be interpreted as a diagnosis of location, which results from a combination of several factors. Usually, dermatitis presents mildly, like a typical eruption, however, it also may present anomalous, more severe and with eruptive elements suggestive of other dermatoses [1].

Furthermore, individuals of other age groups can also manifest the disease in specific situations associated with urinary and fecal incontinence [2]. In this sense, this article aims to analyze the most severe forms of the disease and its consequences, as well as its histopathology, and finally address the diagnosis and treatment, which in most cases does not present difficulties [1]. Therefore, to describe the most common manifestations of the disease, analyzing the main causes, symptoms and treatments, to discuss the etiopathogenesis of the disease and the most serious consequences of dermatitis in the diaper area, in addition to analyzing the forms of diagnosis and the importance of the histopathological examination to carry out an investigation for more accurate information about the disease are the main objective of this study [3].

Methodology

This article is a study on the etiopathogenesis of diaper dermatitis with the purpose of gathering and synthesizing the content of scientific articles about the disease, in order to obtain a better understanding of its clinical conditions. This study contains searches for scientific articles found in the databases: MEDLINE via PubMed and SciELO. To choose the scientific studies suitable for the objectives of this study, the following descriptors were used: Dermatitis, diaper area, infection. At the end of the research, 13 publications met the criteria and were selected to compose the study.

The inclusion criteria were found from the advanced search, carried out between September and December 2020, using filters in three languages (Portuguese, English and Spanish) and with a publication date between 2008-2019. Articles that did not address the objective of the study were excluded, as well as research focusing on other areas outside the descriptors, after prior reading of the abstract of the manuscripts, as well as those arising from publications between the years prior to 2008 and publications not indexed in format printed or electronic.

Results

Dermatitis of the Diaper Area

It is an acute inflammatory reaction that affects the region of the pelvis that is covered by the diaper, often in children under 2 years old (frequent onset between the 1st and 2nd month of life). Its pathophysiology involves some factors, among them the one that stands out the most is the prolonged occlusion of the skin by the diaper, with little protection and consequent maceration of the epidermis. The wet epidermis is more susceptible to damage caused by friction in the diaper, which makes the skin vulnerable, making it more permeable to irritants and microorganisms present in

urine and feces. The inflammation induced by chemical and frictional irritation promotes greater penetration agents, thus enabling secondary infection by microorganisms such as *Pseudomonas*, *Candida albicans*, *Enterococcus faecalis* and *Proteus* [4].

It is known that the term “diaper dermatitis” refers to a set of dermatoses in the region covered by the diaper, which may extend to other regions if there is no adequate treatment. Regardless of the etiological agent or cause of diaper dermatitis, what becomes crucial is prevention, through proper hygiene of the site, frequent diaper change and, if possible, changing the disposable diaper for a tissue or diaper with superabsorbent technology, aiming at a quick regeneration of epithelial tissue [1].

It is necessary to consult a specialist, because the use of ointments, creams, oils, soaps and medications without proper medical advice can cause allergic reactions and worsen the irritation to the injured area. It is worth pointing out that the risk of being affected by this disease is not altered by socioeconomic conditions, race and sex, but by correct and balanced hygiene after physiological eliminations. Also, after sweating excessively or remaining for a considerable time wearing the same diaper [1].

The skin changes in this dermatosis are triggered by a series of mechanisms, which the main is the prolonged contact or irritation by urine and feces, the maceration caused by the heat and humidity of the region. The prolonged contact of the epidermis with the diaper wet with urine increases both the permeability of the skin to irritants and the pH of the environment, thus intensifying the activity of fecal proteases and lipases, which are the major irritants and responsible for the manifestations [5].

Dermatitis can become a serious infection when, due to the pH alterations in the area, bacteria or fungi proliferate, favored by the appropriate culture medium that the region becomes. It increases the injury to the epidermis, the organism's first structural defense, and the invasion of microorganisms in deep layers, including the bloodstream, in severe cases. Thus, it is essential to have appropriate dermatological follow-up in age groups that use diapers, whether elderly or infants, in order to avoid preventable discomforts [1].

Discussion

Primary Irritative Nappy Area Dermatitis

Primary irritant diaper dermatitis is the most frequent type of diaper area dermatitis. Thus, it demands greater concern and care. This dermatitis is a source of significant

discomfort, as wearing a diaper promotes increased heat and humidity in the area. As a result, there is wear and tear on the skin, which becomes more susceptible to inflammation due to continued contact with physiological eliminations. This humid, hot and injured environment, in contact with urine and feces, provides predisposition for secondary infections by *Pseudomonas*, *Candida albicans*, *Enterococcus faecalis*, *Proteus*, *Staphylococcus* and *Streptococcus*.

The use of creams, ointments or any substance without the prescription of a specialist can worsen the clinical condition. It is notorious that it is a dermatitis triggered by a wide range of factors, which initially affects the level of the stratum corneum. This corresponds to the outermost layer of the epidermis, where there is an abundance of keratin and dead cells responsible for protecting the skin against friction, impact, abrasions, among other agents mentioned previously [1].

During the worsening of dermatitis in the primary diaper region, it is essential to identify some factors:

- 1. Diapers:** The diaper, due to the evolution of the protection and quality of the material, has little relationship with the development of irritative dermatitis. In developed countries, the decrease in the frequency and severity of diaper dermatitis is mainly due to the encouragement of using better materials in the manufacture of diapers [6].
- 2. Feces / Urine:** The existence of several aggravating factors is discernible, such as ammonia, which is a product of the decomposition of urea, carried out by bacteria. Ammonia as a single agent does not cause dermatitis, but if the skin is previously injured, the chances of starting the inflammatory process increase. In addition, this substance provides an increase in local pH, and this change in the diaper area activates fecal lipases and proteases. These enzymes are protagonists in the pathophysiology of dermatitis.

Feces largely contain these digestive enzymes that wear down and irritate the skin barrier when there is prolonged contact of the skin surface with the diaper. Diarrhea illustrates this fact. In the literature, there is a substantial relationship between bile acids and the appearance of dermatitis [7].

3. Friction: The child movements, the friction between two areas of the skin and between the skin and the diaper act as predisposing factors for the development of a form of dermatitis on shapely regions such as the genitals, thighs, known as the "W" region [8].

4. Hydration: Hyperhydration of the skin is a clinical situation that can be generated by the release of urine, by fever, and by the formation of a hot and humid environment.

This combination of factors favors friction by movement and the development of secondary infections [9].

5. Temperature: With the blocking of perspiration by the skin located in the area surrounded by the diaper, there is an increase in local temperature and, consequently, in vasodilation and risk of inflammation. It also functions as a culture medium for the proliferation of microorganisms.

6. Chemical irritants: Deodorants, soaps, oils, preservatives, talc, ointments, herbal baths, lotions may potentialize irritation. Some drugs can be irritating when excreted, and can also affect the motility of the intestinal flora, so they must be evaluated and checked in the diagnosis of dermatitis [1].

7. Microorganisms: Dermatitis in the diaper area, like any skin lesion, may be associated with a secondary infection resulting from a vulnerable state of the skin's defense barriers. Superinfections by *Candida albicans* and *Staphylococcus aureus*, by bacteria such as *Pseudomonas*, *Streptococcus*, *Proteus*, *Enterococcus faecalis* are quite common, and in cases of infant dermatitis with more than three days of evolution, contamination by *Candida Albicans* is frequent [10].

Fecal bacteria possibly have a relationship (in conjunction with *Candida albicans*) in the production of rash. It is noteworthy that *Candida* produces keratinases which enable it to penetrate the epidermal barrier and that evidence shows that infection with *C. albicans* is prominent in the development of epithelial lesions [6].

Most Serious Consequences of this Syndrome

The newborn's skin is characterized by sensitivity, weakness and fragility, going through a process of gradual adaptation to the environment outside the womb, which requires attention [1]. This happens because the immaturity of the epidermal barrier significantly reduces the defense against microbial growth, making the skin more susceptible to damage. It is quite frequent the appearance of opportunistic secondary infections to diaper dermatitis that aggravate the patient's condition, such as Candidiasis or bacterial infections by *Pseudomonas*, *Staphylococcus* and *Streptococcus* and, if nothing is done, it can evolve into maceration and exudation, acneiform lesions, vesicle or blister formation, erosions or ulcers, penile, vulvar or urinary tract infections [2].

Candidiasis is considered the main complication of diaper dermatitis, and when it occurs at the same time, erythema exacerbates and pustular lesions and satellite lesions appear [1]. Furthermore, there is seborrheic dermatitis, which is a chronic inflammatory disease that usually affects the diaper area and clinically manifests as erythemato-squamous

lesions in the intertriginous area and, even though it preferentially affects the folds, unlike candidiasis, it does not have satellite lesions. Thus, it is highlighted that dermatitis of the diaper area may cause more serious consequences to infants and, therefore, should be monitored and treated appropriately [11-13].

Conclusion

From the analysis of the articles selected according to the inclusion and exclusion criteria, it was possible to discern the main causes of dermatitis of the diaper area, which mainly includes the formation of a favorable environment for skin maceration and the multiplication of microorganisms from feces and urine. Regarding symptomatology, the most common manifestations involve skin laceration, inflammation, and susceptibility to secondary infections.

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