

## Diaper Dermatitis in Elderly

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### Abstract

Diaper area dermatitis in elderly is usually associated with urinary incontinence, or mental disorders such as Alzheimer's, is an acute and irritant dermatitis caused by disposable diapers. Clinically presents with erythema, edema, erythematous-squamous plaques, papules and satellite lesions. Its association with *Candida* spp. is over 60%, been the most important *Candida albicans* and *Candida glabrata*. The control of the disease is done with constant exchange of diapers, and use of emollients, in cases associated with *Candida* spp. the use of topical and systemic antimycotics is necessary.

**Keywords:** Diaper dermatitis; Elderly; Urinary incontinence; *Candida albicans*; *Candida non-albicans*

### Background

Diaper dermatitis (DD) is an acute irritant and inflammatory dermatitis of the perineal and perianal area, is a very frequent entity in children [1,2]. However, it can also occur in adults and the elderly due to the use of disposable diapers in patients with urinary incontinence or bedridden in hospitals, especially in the ICU or with several mental disorders especially Alzheimer's disease, their constant use is the great solution for the management and retention of urine and feces [3,4]. Unlike the studies in children, Diaper Dermatitis in Elderly (DDE) data is not known precisely because there are few studies reported, therefore there are no data on prevalence or incidence [3,4]. Our main objective is to make a short review and commentary on diaper dermatitis in the elderly and provide some therapeutic options for its management and control.

### Pathogenesis

It is considered that, like children, the diaper in the elderly causes skin irritation and most cases resolve in one or two days without treatment, however cases that exceed three days usually complicate, particularly because they are associated with Infections [1-3]. It is important to note that most cases are related to urinary incontinence because urine alone is a primary irritant to the skin [5,6]. However, the pathogenesis of DDE is not known, but it can be compared with what is known in children, that their development is complex and multifactorial, factors that may interfere are: increase of pH (by microbial flora); excessive humidity, which generates more friction with direct damage to the skin barrier; production of ammonium hydroxide (by increasing pH); presence of lipases and proteases (by contact with feces), these are irritating to the skin generating severe erythema and cutaneous damage, humidity and several proteolytic enzymes have been found to degrade filaggrin, which has been described as a natural moisturization factor (NMF), and higher level of transepidermal water loss (TEWL), both factors act on the direct function of the cutaneous barrier [7,8] the association of microbial

flora is very important, of the most reported bacteria is *Staphylococcus aureus*, some even methicillin resistance strains; in a lower proportion: *Streptococcus* spp. ( $\beta$ -hemolytic) and *Escherichia coli* [4,9]. However, the most important infectious association as well as children is with *Candida* yeasts, particularly *Candida albicans*, which has been reported in more than 60% [10]. However this number may be higher depending on the duration of the diaper and especially the presence of feces, in our experience is 80%. Yeasts act as an opportunistic secondary infection, but its treatment is necessary, most come from the intestinal flora, vaginal and oral.

In the case of DD of the infant is mostly caused by *C. albicans*, yeasts that are sensitive to most treatments; however in the adult and elderly the presence of the group *Candida non-albicans* is larger, and it must be emphasized that species such as *Candida glabrata* has a greater presence (in the vagina and mouth), and therefore can be an irritated skin colonizer of the diaper area, the importance of this is that they are species that get easily acquired resistance to treatments such as fluconazole and other antimycotic agents [4,11]. In a study that we conducted (Table 1), predisposing factors and etiology were observed; the latter group reported that the non-albicans group was approximately 31.6%. The presence of *Candida* spp. in the diaper area is stimulated because they are acidophilic, and when the pH increases, they are easily adapted by pair genes, PHR2 (acid) and PHR1 (neutral or basic) [12].

As in children the DDE can be controlled with constant changing of diapers, so with the use of high-tech diapers like: hypoallergenic, superabsorbent (sodium polyacrylate) [1,2,4] and specially the breathable diaper [9], which have micropores that allow evaporation, and compared to traditional diapers reduce half of DD, there is even a study in adults (healthy volunteers) comparing both diapers, in which *C. albicans* was inoculated, and it was observed that breathable diapers reduced by 62% CFU (Colony Forming Unit) [9]. The disadvantage is the cost that does not allow its massive use particularly in underdeveloped countries [4]. In general the climate does not generate influence on DD if there is a constant exchange of diapers, although it is known that in humid and hot regions there may be a greater number of cases.

Predisposing factors	n/%	Etiology
Urinary incontinence	12 (54.5%)	<i>Candida albicans</i> 14 (63.6%)
Bedridden patient (ICU)	5 (22.7%)	<i>Candida glabrata</i> 04 (18.2%)
Mental disorder (Alzheimer)	4 (18.2%)	<i>Candida parapsilosis</i> 03 (13.6%)
Topical steroids (betamethasone)	1 (4.5%)	<i>C. albicans</i> + <i>C. tropicalis</i> 01 (4.5%)

**Table 1:** Predisposing factors of 22 cases of diaper dermatitis in the elderly.

### Clinical manifestation

The clinical aspects are similar to those of DD of the infant, affecting the buttocks, perineum, groin and sometimes part of the genitals, constituted by erythema, and edema, when associated with *Candida* infection, erythematous plaques with papules and pustules are presented in the form of satellite lesions, there may be severe cases with erosion and ulceration [2,4,13,14]. In extreme cases granulomatous lesions of the diaper area can be formed with nodular or verrucous lesions [15,16]. In general the symptoms of DDE are burning and pruritus, but it is difficult to evaluate the symptoms, particularly in patients with mental damage [4,10,17,18]. The most important differential diagnoses are eczema, inverse psoriasis and contact dermatitis [4,10] the latter in particular to substances such as rubber components of retarder vulcanization or adhesives (glues), especially three compounds: mercaptobenzothiazole, p-tertiary-butylphenol-formaldehyde resin) and cyclohexylthiophthalimide [10,19].

### Laboratory diagnosis

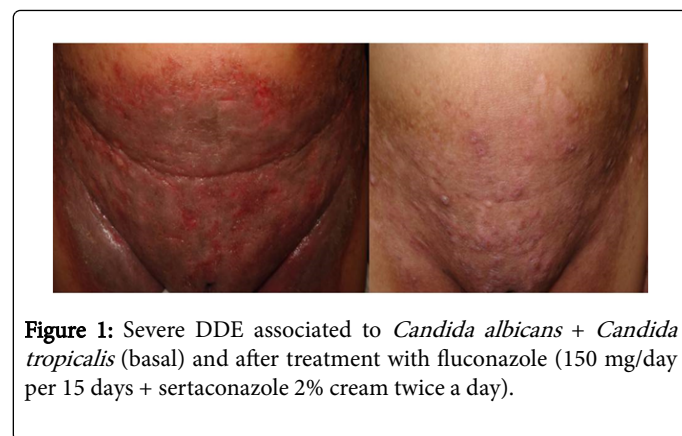
Because the association by *Candida* spp. is of great importance for the treatment, it is necessary to have a laboratory diagnosis that is done by direct examination (10% KOH) or stains with the presence of pseudohyphae and blastoconidia, and only in *C. glabrata* infection blastoconidium clusters are seen; the cultures are necessary to know the species, being the CHROMcandida® of greater utility. Their identification is confirmed by biochemical, molecular and/or proteomic tests [1,4].

### Therapeutic options

The first therapeutic advice is a constant diaper change that reduces the presence of urine and feces, likewise barrier creams, or emollients such as petrolatums, lanolin and creams with zinc oxide can also be used and control of urinary incontinence is also important [13,14,20,21]. Low-potency steroids (hydrocortisone) are only recommended for short time and as long as the DDE is not associated with bacterial or mycotic infections [1,4]. In the initial and small cases of DDE associated with *Candida* can be treated with topical antimycotics such as nystatin, ciclopirox or imidazole derivatives such as clotrimazole, miconazole, ketoconazole, bifonazole and sertaconazole; they are generally applied twice a day for 7-10 days [4,22,23].

Systemic therapy is recommended only for severe cases and associated with oral, and gastrointestinal infection. The most commonly used drug is fluconazole at doses of 100-150 mg/day for periods of 1 week to 1 month depending on the outcome. (Figure 1).

Nystatin in suspension is also recommended at a dosage of 1 ml 3-4 times a day (100,000 IU) [4,13,14].



**Figure 1:** Severe DDE associated to *Candida albicans* + *Candida tropicalis* (basal) and after treatment with fluconazole (150 mg/day per 15 days + sertaconazole 2% cream twice a day).

In cases of bacterial association, topical treatments applied two or three times daily with bacitracin, fusidic acid and mupirocin are recommended, the latter also having moderate action against *Candida* spp. [4,10,14].

### Conclusion

DDE is a very frequently observed entity, presented mainly in bedridden patients or in those with urinary incontinence who use disposable diapers and its association with *Candida* is high (60-80%). DDE in the initial stages can be treated with inert creams and emollients and when there is an infection by *Candida*, the use of topical antifungals is considered first line treatment and in moderate cases and systemic antifungal in severe cases.

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