Moist toilet papers as possible sensitizers: review of the literature and evaluation of commercial products in Italy

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Introduction

Moist toilet papers, also known as baby wipes, are commonly used for cleaning the perianal skin after a diaper change. The utilization of moist toilet papers is increasing, also among adults, for personal hygiene in the perianal area. Their composition is typically a pulp (paper) and polymer (e.g. polypropylene or polyester) fabric in a solution of water, glycerine or propylene glycol; buffering and wetting agents; preservatives; and, often, fragrances. In addition, some contain botanicals and vitamin E derivates. Few studies have been published on baby wipes, and results of a series of 4 clinical studies demonstrated that disposable baby wipes were mild to the skin (1). Nevertheless, it was pointed out that there is clearly a potential for allergic reactions to their components (2).

In order to identify some possible allergens, we reviewed the literature, using Medline and by extensive manual searching through the Science Citation Index and bibliography of the identified articles. We also analysed 23 types of baby wipes, distributed in Italy, for the presence of known allergens.

Review of the Literature

The first case of allergic contact dermatitis (ACD) from moist toilet papers was reported by Swinyer in 1980 and was related to a fragrance (3). According to the literature, the most frequent allergens are preservatives and fragrances (4). Although allergy caused by preservatives seems to be more prominent, allergy due to fragrances can occur after an exposure to moist paper products, and it was reported even after the use of dry paper products (5–6). Allergic contact perianal dermatitis as a result of a specific fragrance, cinnamic alcohol, was reported in a woman (4).

However, the most common allergens in moist toilet papers are preservatives (6). In the past, the most common allergen was methylisothiazolinone and methylchloroisothiazolinone (MI/MCI), also known as Kathon CG (7–8). There were high sensitization rates to MI/MCI in Europe, because of its widespread use in cosmetic products, especially during the 1980s (9). Nevertheless, it is still widely used in household and industry products.

De Groot et al. reported 5 patients with allergic dermatitis of the perianal area and of other areas (trunk, legs, face, scalp and, in 2 cases, hands). 3 of these patients were allergic to MI/MCI, and all their symptoms improved after stopping the use of moist toilet papers (4).

The frequency of sensitization to MI/MCI gradually decreased, even in Italy, when a consistent number of cosmetic manufacturers replaced Kathon CG with other preservatives (10), particularly with Euxyl K400 (11).

This broad-spectrum preservative system was introduced into the European market in 1985 and, in the last few years, was often used by several cosmetic manufacturers as an alternative to isothiazolinones (10). It is available as a solution containing methyldibromoglutaronitrile and phenoxyethanol. Methyldibromoglutaronitrile is the main cause of ACD. Use of this preservative in moistened toilet tissues has been associated with an increased frequency of sensitization to 1,2-dibromo-2,4-dicyanobutane in Netherlands (12).

In the last few years, other preservatives have been increasingly used in a multitude of leave-on cosmetics, skin-care products and other substances, and cases of contact allergy to moist toilet papers have been reported for formaldehyde (6) and 3-iodo-2-propynyl-butylcarbamate (IPBC) (13). IPBC has been used for years as a fungicide and bactericide for wood and paint preservation, without any reports of cutaneous side-effects, and for this reason, at present, it is frequently utilized in cosmetic products (14). Although few cases of relevant IPBC contact allergy have been reported, this should not be taken as a guarantee for safety and its use should be carefully evaluated (15–16).

Analysis of baby wipes' ingredients in Italy

In order to verify the presence of possible allergens in baby wipes, during February 2006, we examined all brands of moist toilet papers available in Italy (23 products) (Table 1). The brands were: Assorbello (Silc), Aveeno Baby (Johnson & Johnson), Babygella (Rottapharm), Babygoz (Nestlé), Baby Line (Speedy Clean), Chicco Infinite Dolcezze (Artsana), Conad (Conad SC), Coop (Coop Italia), Fissan Baby (Sara Lee Household & Body Care), Fresh & Clean (SCA Group), Huggies Pure (Kimberly-Clark), Ingeo (Cargill-Dow LLC), Johnson's Baby (Johnson & Johnson), Linea Blu (Humana), Moltex (Eco Plan), Mustela Bebé (Laboratoires Expanscience), Nivea Baby (Beiersdorf AG), Pampers (Procter & Gamble), and Penaten (Johnson & Johnson).

Only one product (Fresh & Clean antibacterial) did not report the complete list of all ingredients.

21 moist toilet papers (91.3%) had ingredients that were reported as possible allergens in the literature (6) (Table 1). Preservatives were present in all products, and 19 baby wipes (82.6%) contained preservatives reported as possible allergens. Kathon CG, as MI/MCI, was present only in 1 product, Conad baby wipes (4.3%). Methyldibromoglutaronitrile was not present, while phenoxyethanol was present in 14 products (60.9%). IPBC was present in 4 baby wipes (17.4%), formaldehyde releasers were found in 6 wipes (26.1%), imidazolidinyl urea in 4 moist toilet papers (17.4%), and diazolidinyl urea in 2 wipes (8.7%).

Fragrances were present in 20 baby wipes (87%) although never specified.

Conclusions

Moist toilet papers, introduced primarily for babies, are now increasingly used also by adults for cleansing perianal skin. Their use can be responsible for ACD, especially of the perianal area (4).

From our study it is evident that 91.3% of all moist toilet papers, in Italy, contain possible sensitizers, especially fragrances and preservatives, including Kathon CG.

Table 1. List of all baby wipes brands and possible allergens

Producers	MI/MCI	PHENOX	IODOP	IMIDAZ U	DIAZ-U	Fragrances
Artsana (dolce pulizia al latte)		x		x		x
Artsana (soffice pulizia ai fiori)				x		x
Beiersdorf (fresh lotion)		x				x
Beiersdorf (soft creme)		x				x
Cargill-Dow		x			x	x
Conad SC	x			x		x
Coop Italia			x			x
Eco Plan		x				x
Humana		x				x
Johnson & Johnson (Aveeno Baby)		x	x			
Johnson & Johnson (Johnson's Baby)		x				x
Johnson & Johnson (Penaten)						x
Kimberly-Clark						
Laboratoires Expanscience		x				x
Nestlé		x				x
Procter & Gamble		x				x
Procter & Gamble (Sensitive)						
Rottapharm		x			x	x
Sara Lee		x				x
SCA			x			x
SCA (antibacterial)						x
Silc		x		x		x
Speedy Clean			x			x

MI/MCI, methylisothiazolinone/methylchloroisothiazolinone; PHENOX, phenoxyethanol; IODOP, iodopropynyl butylcarbamate; IMIDAZ U, imidazolidinyl urea; DIAZ U, diazolidinyl urea.

We believe that moist toilet papers should be subjected to a very careful risk evaluation that takes into account their utilization both on keratinized and nonkeratinized epithelia, as well as in occluded areas (17).

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