


CONTACT POINT

Allergic contact dermatitis to incontinence pads in a patient sensitized to multiple (meth)acrylates and formaldehyde

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INTRODUCTION

Close and prolonged contact with sanitary towels may cause allergic contact dermatitis (ACD) from several allergens including fragrances,¹ colophony,² preservatives³ or (meth)acrylates.^{4–6} The moist occluded environment of the genital area, together with the presence of hair follicles, and exposed mucous membranes may promote irritant contact dermatitis, sensitization and ACD including systemic contact dermatitis.⁷

CASE REPORT

An 89-year-old woman with a history of hypertension and urinary incontinence presented with pruritic eczema for over 1 year involving the trunk as well as the flexural and extensor aspects of the upper and lower limbs with progressive worsening. She also suffered from genital eczema for 50 years that was aggravated right before the onset of generalized eczema.

After discontinuation of systemic medications (calcitriol and amlodipine) and initiation of treatment with topical and oral corticosteroids, the lesions temporarily improved, but relapsed following attempts to discontinue the corticosteroid therapy. The lesions in the genital, suprapubic and gluteal areas were circumscribed to the areas in contact with incontinence pads (Tena Lady Extra, Essity Hygiene and Health; Figure 1). A skin biopsy was performed at the suprapubic region, and histopathological examination showed changes compatible with eczema (e.g., focal parakeratosis,

spongiosis and chronic perivascular inflammatory infiltrates with eosinophils).

Patch tests were performed with the Spanish Contact Dermatitis Research Group (GEIDAC) baseline series (TRUE Test, Marti Tor), supplementary allergens including European Society Contact Dermatitis (ESCD) candidate allergens, acrylates and cosmetic series (Chemotechnique Diagnostics), the patient's cosmetics on Finn Chamber Acqua (SmartPractice), occluded with Omnifix E tape (HARTMAN S.A) for 48 h. Positive results were observed to nine (meth)acrylates, including a 3+ reaction to 2-hydroxyethyl acrylate (2-HEA) and 2+ reactions to hydroxyethyl methacrylate and ethyl acrylate (Figure S1). On D2, we patch tested a moistened piece of the incontinence pads cod layer, which was read on D2 and D5 (coinciding with the D4 and D7 readings of the other allergens) giving a ?+ and + reaction on D2 and D5, respectively. Additionally, we observed positive reactions to formaldehyde 2% aq., t-butyl hydroquinone, benzyl alcohol, methylisothiazolinone, methylchloroisothiazolinone/methylisothiazolinone, linalool and limonene hydroperoxides and one moisturizer (Balneum plus, Almirall Hermal GmbH) that she used daily for eczema (Table 1).

The patient had been wearing dentures since the age of 40 without ever having presented reactions from them. She had no bone/joint prosthesis or had never been in contact with medical devices or acrylic manicures.

Pure cotton incontinence pads were recommended to replace the superabsorbent pads and personal care products were replaced leading to resolution of eczema. Unfortunately, cotton napkins were not effective to palliate the urinary incontinence. The patient thus went back to occasionally using the original incontinence pads wrapped in

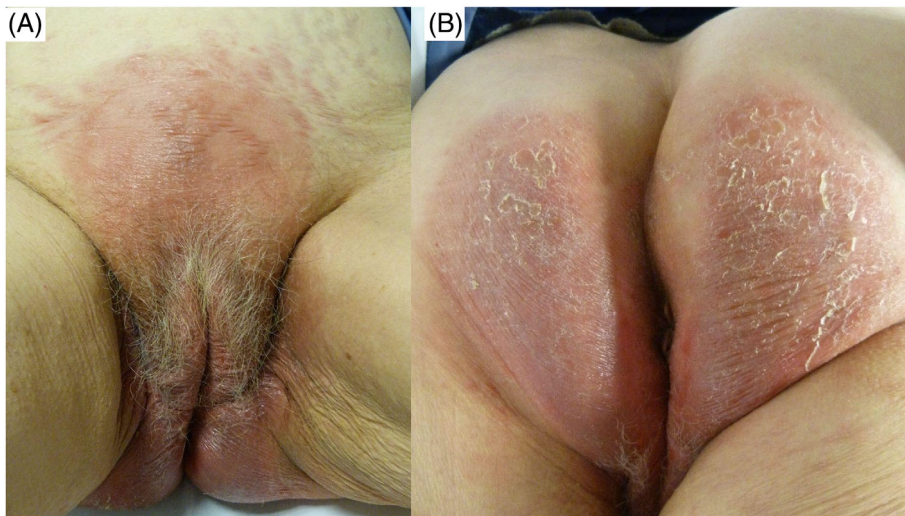


FIGURE 1 (A) Severe chronic eczema circumscribed to the area in contact with the incontinence pad involving the vulvar and suprapubic (A) as well as the perineal and gluteal (B) regions. The intergluteal fold was less affected.

TABLE 1 Positive patch test reactions.

Allergens	Vehicle	Test concentration	Days of reading	Patch test reaction	relevance	Source
Moistened inner aspect of Tena incontinence pad			D2/D5	?+/+	CR	Incontinence pad
Formaldehyde	aq.	2%	D2/D4/D7	-/+/+	CR	Incontinence pad
2-Hydroxy-ethylacrylate	pet.	0.1%	D2/D4/D7	+/++++/+++	Possible CR	Likely related to the incontinence pad
Ethyl acrylate	pet.	0.1%	D2/D4/D7	+/++++	Possible CR	Likely related to the incontinence pad
2-Hydroxyethyl-methacrylate	pet.	2%	D2/D4/D7	++/++++	Possible CR	Likely related to the incontinence pad
2-Hydroxypropyl-methacrylate	pet.	2%	D2/D4/D7	+/+/+	Possible CR	Likely related to the incontinence pad
Ethylene glycol-dimethacrylate	pet.	2%	D2/D4/D7	+/+/+	Possible CR	Likely related to the incontinence pad
Hexanediol dimethacrylate	pet.	2%	D2/D4/D7	+/+/+	Possible CR	Likely related to the incontinence pad
Tetrahydrofurfuryl methacrylate	pet.	2%	D2/D4/D7	+/+/+	Possible CR	Likely related to the incontinence pad
T-butyl hydroquinone	pet.	10%	D2/D4/D7	?+/+/+		Likely related to the incontinence pad
Likely related to cosmetic products and topical treatments						
Balneum plus cream 'as is'			D2/D4/D7	++/++++	CR	Cosmetic product
Benzyl alcohol	sof.	10%	D2/D4/D7	+/?+/?+	CR (present in Balneum Plus moisturizer, methylprednisolone aceponate cream and another moisturizer)	Cosmetic products and topical treatments
Methylisothiazolinone	aq.	0.2	D2/D4/D7	-/+/+	UR	
Methylchloroisothiazolinone/methylisothiazolinone	aq.	0.02	D2/D4/D7	?+/+/-	UR	
Limonene hydroperoxides	pet.	0.3%	D2/D4/D7	-/+/-	CR	Present in one moisturizer, a body cleansing gel and a hair spray
Linalool hydroperoxides	pet.	1%	D2/D4/D7	-/-/+	CR	Present in one moisturizer, a body cleansing gel and a hair spray

Abbreviations: aq, aqua; CR, current relevance; pet, petrolatum; sof, softisan; UR, unknown relevance.

towels made of plush fabric (e.g., for going walking), noting limited relapses of the genital eczema.

DISCUSSION

We contacted the manufacturer of the incontinence pads who unfortunately did not provide information regarding the composition or materials for patch testing; however, they informed us that all their products shared the same superabsorbent core. According to information available online, said absorbent core is made of 'paper pulp and superabsorbent polymers'.⁸ The term 'superabsorbent polymers' (SAPs) usually implies a copolymeric network based on acrylic acid (polyacrylic) and its sodium or potassium salts, or acrylamide (polyacrylamide).⁹ Acrylic polymers are believed not to induce sensitization or elicit ACD due to their high molecular weight. Residual monomers, however, may occur from incomplete polymerization or might be released from polymers by shearing forces.⁵ Moreover, systemic contact dermatitis to superabsorbent material made of polyacrylates in incontinence pads has already been published.⁴ Additionally, the incontinence pads contain an adhesive (which binds together their layers and attaches the product to undergarments) consisting of non-specified 'polymers and synthetic resins'.⁸

Interestingly, the patient showed positive patch test reactions to several acrylates and formaldehyde 2% aq. According to chemical analyses of the Swedish Chemicals Agency, 2-ethylhexyl acrylate and formaldehyde were detected at concentrations exceeding the reporting limits in Tena Lady Extra and other sanitary towels, panty liners and tampons.¹⁰ Notably, our patient was also sensitized to t-butyl hydroquinone (TBHQ) which may be used as an inhibitor of (meth)acrylates spontaneous polymerization.

We believe that sensitizations to formaldehyde and (meth)acrylates were relevant in this case. The skin lesions of distant body were most likely spreading reactions.

Sensitization to components of personal care products and topical drugs may have contributed. The patient had, for instance, a sensitization to benzyl alcohol which was found in three of her products, including the moisturizer causing a positive patch test. We have no evidence that the incontinence pads contained any of the other positive allergens. This is, however, possible since it has been reported that absorbent hygiene products often contain fragrances¹¹ and preservatives.³

In the United States, sanitary pads are regulated by the FDA as Class I medical devices, whereas in the EU and Canada, they are considered articles regulated as consumer products.¹² We believe that it should be mandatory for manufacturers to provide transparent information on their composition and to cooperate with the patch test investigations.

It should be stressed that positive patch test reactions to (meth)acrylates and formaldehyde might be relevant in patients with genital or generalized eczema using absorbent hygiene products.

AUTHOR CONTRIBUTIONS

María E. Gatica-Ortega: Conceptualization; investigation; methodology; writing – original draft; writing – review and editing; supervision; project administration; resources. **María A. Pastor-Nieto:** Conceptualization; investigation; writing – original draft; methodology; writing –

review and editing; project administration; supervision; resources.

Pedro Beneyto: Investigation; methodology; supervision. **Leopoldo Borrego:** Investigation; methodology; supervision; writing – review and editing; conceptualization.

CONFLICT OF INTEREST STATEMENT


The authors declare no conflict of interest.

ETHICS STATEMENT

The authors obtained informed written consent from our patient for the attached photographs to be published.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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