

Hydroxyethyl acrylate: a potential allergen in cosmetic creams?

Contact Dermatitis 2008; 59: 321–322

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Key words: 2-hydroxyethyl acrylate; acrylates; acrylic monomer; allergic contact dermatitis; anti-cellulite; cosmetics; creams.

Acrylates form a large group of chemical substances derived from acrylic acid. In cosmetics, contact allergy to (meth)acrylates may be caused by exposure in artificial nails and glues in both an occupational and a non-occupational context (1, 2). Acrylic monomers are allergenic, while the

polymerized products have little or no allergenic capacity because little residual monomer is left. However, sufficient monomer may remain to induce/ elicit contact allergy.

We report the case of a patient with allergic contact dermatitis from a cosmetic cream, most likely due to 2-hydroxyethyl acrylate (2-HEA).

Case Report

A 43-year-old non-atopic nurse, known to have contact allergy to nickel and thiomersal, presented in July 2007 with a 3 D history of a papulovesicular eczematous eruption, with an urticarial component, on the flexural aspect of both upper arms, the medial aspect of both thighs, and the abdomen. On her lower legs, she had an oedematous and exudative dermatitis, covered with yellow crusts. Two weeks previously, she had first used on her skin an 'anti-cellulite'/'intense firming' cream (ThalgoSculpt®, Thalgo, Australia). An acute allergic contact dermatitis from this cream was suspected. She was treated aggressively with topical and then systemic steroids. However, 20 D after having stopped the corticosteroid therapy, she again presented with a rash on the chest, abdomen, and thighs; this had occurred after having a cork floor at her home treated with a varnish.

In October 2007, she was patch tested to European baseline series (Trolab, Hermal, Reinbek, Germany), a cosmetic, textile, and, on the request of her dentist, acrylate series (Chemotechnique, Malmö, Sweden) as well as with ThalgoSculpt intense firming cream and its ingredients [van der Bend patch test chambers (van der Bend, Brielle, the Netherlands) applied on the back with Micropore™ (3M Health Care, Borken, Germany) and secured with Mefix® (Mölnlycke Health Care, Göteborg, Sweden)]. Readings were according to International Contact Dermatitis Research Group guidelines and read at D2 and D4 and also later.

The known contact allergies to nickel and thiomersal were confirmed. There were additional reactions to the ThalgoSculpt cream tested 'as is' (+ D2 and ++ D4), 2-hydroxyethylacrylate (HEA) 0.1% pet. (++ D2 and ++ D4), 2-hydroxyethyl methacrylate (2-HEMA) 2% pet. (– D2 and + D4), and at a later reading also to ethylene glycol dimethacrylate 2% pet.

(EGDMA) (– D2, – D4 and + D9), methyl methacrylate (MMA) 2% pet. (– D2, – D4 and + D9), and chloracetamide 0.2% pet. (– D2, – D4 and + D11). A repeated open application test on her arm with the 'intense firming' cream ('as is') produced a strong positive reaction after 1 day.

Discussion

2-HEA (CAS 818-61-1) is an acrylic monomer used in the preparation of ultraviolet curable inks and coatings or in photo-prepolymer printing plate procedures. According to information obtained from the company as well as to the product ingredient label of the ThalgoSculpt intense firming cream, HEA was listed among the ingredients as follows: '... , Fragrance, Hydroxyethyl Acrylate/Sodium acryloyldimethyltaurate copolymer, Macrocystis pyrifera extract, ...', i.e. as a copolymer. Acrylate copolymers are used in cosmetics as binders, film formers, hair fixatives, suspending agents, viscosity-increasing agents, and emulsion stabilizers. After polymerization, very little residual monomer is left.

Unfortunately, the product was withdrawn once the allergen was identified; so, we were not able to analyse the amount of this monomer in the cream.

As far as we know, there are no other reports of allergic contact dermatitis from acrylates in such products, and because the rash only appeared after 2 weeks of application, the 'intense firming' cream probably caused primary sensitization to 2-HEA. However, 2 months later, the dermatitis recurred after a floor was varnished; the varnish information insert stated that it was a 'one-component waterborne finish, based on polyurethane acrylate' [however, such information sheets are not reliable (3)].

Late positive reactions to EGDMA and MMA were observed, which would have been missed if additional readings had not been performed. This is in accordance with that previously stated in the literature for 2-HEA, 2-hydroxypropyl-acrylate (HPA), 2-HEMA, 1,4-butanediol-dimethacrylate (BUDMA), 1,6-hexandiol-diacrylate (HDDA), tetrahydrofurfuryl-methacrylate (THFMA), triethyleneglycol-diacrylate (TREGDA), 1,4-butanediol-diacrylate (BUDA), diethyleneglycol-diacrylate (DEGDA) (4), and for EGDMA (5). These authors showed a simultaneous reaction pat-

tern to 2-HEMA, EGDMA, and MMA; however, our patient also reacted to other methacrylates and several acrylates.

We could not determine any relevance for the positive reaction to the preservative chloracetamide.

Conclusion

This concerns a patient who suffered from a severe allergic contact dermatitis following the use of a skin firming cream containing 2-HEA. Patch testing did not identify any other potential allergen present in the product. Unfortunately, the cream was no longer available for chemical analysis. According to the literature, acrylic monomers – in the levels found in cosmetic formulations – should not be a problem; however, as in this case, residual monomers might perhaps still be present in creams in a high enough concentration in order to cause contact allergic reactions.

References

1. Lazarov A. Sensitization to acrylates is a common adverse reaction to artificial fingernails. *J Eur Acad Dermatol Venerol* 2007; 21: 169–174.
2. Geukens S, Goossens A. Occupational contact allergy to (meth)acrylates. *Contact Dermatitis* 2001; 44: 153–159.
3. Henriks-Eckerman M L, Kanerva L. Product analysis of acrylic resins compared to information given in material safety data sheets. *Contact Dermatitis* 1997; 36: 164–165.
4. Goon A, Bruze M, Zimerson E, Goh C, Isaksson M. Contact allergy to acrylates/methacrylates in the acrylate and nail acrylics series in southern Sweden: simultaneous positive patch test reaction patterns and possible screening allergens. *Contact Dermatitis* 2007; 57: 21–27.
5. Goon A, Isaksson M, Zimerson E, Goh C, Bruze M. Contact allergy to (meth)acrylates in the dental series in southern Sweden: simultaneous positive patch test reaction patterns and possible screening allergens. *Contact Dermatitis* 2006; 55: 219–226.

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