

Contact Allergy to Formaldehyde – Diagnosis and Clinical Relevance

INESE DUBNIKA HAUSSON

Department of Occupational and Environmental Dermatology, Skåne University Hospital, Malmö, Sweden. E-mail: Inese.Dubnika_Hauksson@med.lu.se

Inese Dubnika Hauksson recently defended her PhD thesis “Contact Allergy to Formaldehyde. Diagnosis and Clinical Relevance” on 28th May, 2014 at Lund University. Opponent was Professor Lennart Emtestam, Karolinska University Hospital, Stockholm. The thesis is available from <http://www.lunduniversity.lu.se/lup/publication/4436848>.

Preservatives are added to products to prevent decomposition. They are mostly used in water-based products to prevent the growth of microorganisms which can degrade the product. Preservatives are widely used in household and industrial products, and most people are exposed to one or more preservatives on a daily basis. Many preservatives are biologically reactive substances, and as such have allergenic potential. Formaldehyde is a well-known and widely used preservative, and contact allergy to formaldehyde and formaldehyde-releasing preservatives is common.

The aim of the work presented in this thesis was to improve the diagnosis of contact allergy and allergic contact dermatitis caused by formaldehyde. The most important findings are given below.

- Patch testing with formaldehyde 2.0% aqua (0.60 mg/cm²) detects significantly more contact allergies than 1.0% aqua (0.30 mg/cm²) (1). When comparisons are made between the results obtained with different concentrations, it is important that the dose per unit area is standardised. Using micropipettes in the patch test technique with 2.0% aqua formaldehyde does not lead to a high frequency of irritant reactions.
- The results of performing the repeated open application test (ROAT) on healthy skin (2) demonstrate that individuals who react to 2.0% formaldehyde but not to 1.0%, have a significant risk of exhibiting an eczematous reaction when exposed to a moisturiser containing levels of formaldehyde in accordance with the EU Cosmetics Directive (2,000 ppm).
- Formaldehyde is a ubiquitous contact allergen, present in many of the products in daily use. Approximately 20% of skin care products contain formaldehyde. Formaldehyde-release corresponding to around 2.5–40 ppm is common in these products, despite the fact that no formaldehyde or formaldehyde-releasing preservatives are declared in the labelling (4).
- The results of the ROATs performed on experimental dermatitis (3) demonstrate that exposure to moisturisers with



Inese Dubnika Hauksson defended her thesis on 28th May 2014 in Lund University.

formaldehyde concentrations of 2.5–40 ppm is sufficient to exacerbate existing dermatitis.

- In both ROAT studies (2, 3), 3 weeks or more were needed to elicit a positive reaction in 50% of the individuals. This is a very important finding from clinical point of view, since the physician or the patient does not normally associate dermatitis with a product that has been used for an extended period.

Based on the results of these studies (1–3) and other comparative studies, the ESCD (European Society of Contact Dermatitis) and EECDRG (European Environmental and Contact Dermatitis Research) have recommended that the formaldehyde concentration in the European baseline series should be increased to 2.0% (0.60 mg/cm²), and that 15 µl of the solution should be administered using a micropipette.

Analyses of skin care products used by formaldehyde-allergic individuals have been routinely carried out at our department, using the chromotropic acid method, for several decades. However, to the best of our knowledge, such analyses are rarely performed at other clinics performing patch tests. Since exposure to low concentrations of formaldehyde has

been shown to be clinically relevant, at least in patients with dermatitis, it is important that the patients' skin care products and sources of occupational exposure be analysed, especially when formaldehyde or formaldehyde releasers are not declared in the product labelling. This will facilitate optimal management of formaldehyde-allergic patients, ensuring healing of their dermatitis and the prevention of a chronic condition.

Literature

1. Hauksson I, Pontén A, Gruvberger B, Isaksson M, Bruze M. Routine diagnostic patch testing with formaldehyde 2.0% (0.60 mg/cm²) may be an advantage compared to 1.0%. *Acta Derm Venereol* 2010; 90: 480–484.
2. Hauksson I, Pontén A, Gruvberger B, Isaksson M, Bruze M. Clinically relevant contact allergy to formaldehyde 2.0% may be missed by testing with formaldehyde 1.0%. *Br J Dermatol* 2011; 164: 568–572.
3. Hauksson I, Pontén A, Gruvberger B, Isaksson M, Engfeldt M, Bruze M. Skin care products containing low concentrations of formaldehyde detected by the chromotropic acid method can not be safely used by formaldehyde-allergic individuals. Submitted for publication in *Br J Dermatol*.
4. Hauksson I, Pontén A, Isaksson M, Hamada H, Engfeldt M, Bruze M. Are formaldehyde-allergic patients more exposed to formaldehyde in skin care products than patients without contact allergy to formaldehyde? Submitted for publication in *Contact Dermatitis*.