



LUND UNIVERSITY
Faculty of Medicine

LU:research

Institutional Repository of Lund University

This is an author produced version of a paper published in Contact Dermatitis. This paper has been peer-reviewed but does not include the final publisher proof-corrections or journal pagination.

Citation for the published paper:

Isaksson, Marlène and van der Walle, Henk.

"Occupational contact allergy to cysteamine hydrochloride in permanent-wave solutions."

Contact Dermatitis, 2007, Vol: 56, Issue: 5, pp. 295-6.

<http://dx.doi.org/10.1111/j.1600-0536.2006.01019.x>

Access to the published version may
require journal subscription.

Published with permission from: Blackwell

Occupational contact allergy to cysteamine hydrochloride in permanent-wave solutions

¹Marléne Isaksson, ²Henk van der Walle

¹Department of Occupational and Environmental Dermatology, University Hospital MAS,

Lund University, Malmö, Sweden, ²Centrum voor Huid en Arbeid, Arnhem, The Netherlands

Key words: Contact allergy; hairdresser; patch test.

Corresponding author:

Marléne Isaksson

Department of Occupational and Environmental Dermatology

Malmö University Hospital

SE 205 02 Malmö, Sweden

e-mail: marlene.isaksson@med.lu.se

Due to the prohibition of glyceryl thioglycolate (GTG) in permanent-wave solutions in several European countries, American suppliers of permanent-wave solutions have started to market cysteamine hydrochloride (CHC). We report the case of a Swedish hairdresser found to be hypersensitive to CHC and also the patch test results from a special hairdresser's clinic in The Netherlands.

Case report

A 53-year-old Caucasian female had worked as a hairdresser since the age of 16 and in her own salon since 27 years without employees. She had flexural atopic eczema as a child. At presentation she informed us of recurrent hand eczema on the hypothenar eminences since 15 years which waxed and waned. 4 months prior to presentation, she suddenly got erythematous and oedematous fingers accompanied by a burning and stinging sensation followed by skin desquamation. Wearing protective gloves ameliorated her skin symptoms.

She was patch tested to our standard, hairdresser's, and cosmetic's series and her own working materials. Patch testing was performed according to the International Contact Dermatitis Research Group with the Finn Chambers[®] (Ø 8mm) test system (Epitest Ltd Oy, Tuusula, Finland) secured with Scanpor[®] tape (Norgesplaster A/S, Vennessla, Norway).

Fifteen microlitres of each test solution were micropipetted on to the filter paper discs. Tests were left on the upper back for 48 h and readings took place on day (D)3 for all tests and also on D7 for all 3 series. The hairdresser's series containing both GTG and ammonium thioglycolate (ATG) was negative but she reacted to her own permanent-wave solution of the neutral type, viz. Keune Bioperm Vital Extra (Keune Haircosmetics, Soest, The Netherlands), (2.0% aqua ++, 0.2% ++, D3). The concentration of CHC in the perm was 5%. Aqueous serial dilutions of this permanent-wave solution from 2.0% to 0.006% was positive down to 0.06%. This concentration was tested in 20 controls, no one reacted. In a third patch test session components of the solution in question were tested and the patient only reacted to

CHC 1.0% pet., (++, D3). When avoiding permanent-wave solutions containing this amine salt and wearing protective gloves her dermatitis cleared.

Patch-test results from The Netherlands

Among 1347 hairdressers patch tested during a 10-year period (from 1994 to 2004) to various chemicals used by hairdressers including CHC 0.5% pet., 16 were found to react to CHC with a positive reaction (1.2%), all of which were clinically relevant for their dermatitis. In all these cases there was an evident occupational exposure to CHC-containing perms.

Discussion

In our experience, perm allergies are rare nowadays, mainly due to these not being very popular today and the fact that GTG is no longer used by the major European producers of permanent wave solutions. Instead ATG and CHC are used. To our knowledge, only one case of contact allergy to CHC has been published before (1), even if CHC has been marketed in waving and straightening products since the mid-1980s in Europe and in the United States since 1993 in permanent-wave solutions.

CHC functions as a reducing agent and is found typically at concentrations between 5% and 12% in permanent solutions (2). The chemical structure of this amine salt is $\text{HSCH}_2\text{CH}_2\text{NH}_2\text{HCL}$, structurally distinct from the thioglycolate structure of GTG and ATG. Therefore, cross-reactions between CHC and the thioglycolates are unlikely. If a hairdresser reacts to both, cosensitization is the most likely explanation. The advantages of CHC permanent waves have been discussed by Landers et al. in the aforementioned article (1). One may use it as a one-part permanent-wave process, the reaction occurs at a more neutral pH. Thought to be less damaging to the hair shaft, it is preferred by hairdressers for colour-treated or damaged hair, CHC did not permeate through latex gloves when patch tested and CHC-permed hair was not capable of inducing contact dermatitis on patch testing. CHC permanent-wave solutions can however be more expensive than the GTG and ATG solutions (1).

All cases from the Netherlands were related to the use of 1 brand of perms during a certain period of time, and after 2004 there have not been any new cases found. The exact reason for this is unclear, but the supplier may have lowered the concentration of CHC in the perms. However, as CHC is used in permanent wave solutions and hairdressers are exposed to this allergen, the inclusion of CHC into hairdresser's series could be encouraged.

References

1. Landers M, Law S, Storrs FJ. Permanent-wave dermatitis: contact allergy to cysteamine hydrochloride. *Am J Contact Dermat.* 2003 14: 157-160.
2. Marks JG, Belsito DV, De Leo VA, et al. North American Contact Dermatitis Group Patch-Test Results, 1996-1998. *Arch Dermatol* 2000; 136: 272-273.