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CASE REPORT

Hydroxyisohexyl 3-cyclohexene carboxaldehyde (Lyral®) as allergen: experience from a Contact Dermatitis Unit

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Abstract

Introduction: Hydroxyisohexyl 3-cyclohexene carboxaldehyde (HICC)—Lyral® is a widely used synthetic fragrance found in personal care and household products. It is an aldehyde, lipophilic enough to penetrate the skin and is a frequent cause of contact sensitization.

Objective: Describe the frequency of contact allergy to HICC in a Contact Dermatitis Unit, after its inclusion in baseline patch test series.

Methods: A retrospective study including all patients submitted to patch test, from January 2007 to December 2009.

Results: Over a 3-year period, 629 consecutive patients were patch tested. The frequency of positive reactions to HICC was 2.7% (17/629). Of the positive patients, 35% (6/17) gave a history of atopy, 58.8% (10/17) had eczema on the face and neck, 23.5% (4/17) on the hands, 23.5% (4/17) in the axillae, 17.6% (3/17) on the trunk and 6% (3/17) had generalized eczema. All patients were patch positive for more than one allergen: all (17/17) positive to fragrance Mix 2 (FM2); 47% of the patients (8/17) positive to fragrance Mix 1 (FM1); and 23.5% of the patients (4/17) positive to Balsam of Peru. In 94% (16/17) of cases, the reaction was judged to be of current relevance.

Discussion: The frequency of positive reactions to HICC of 2.7% found in our population is according to what is described in several European reports, where HICC is still widely used as a fragrance ingredient. In contrast, in North America, the prevalence is lower. All the patients were positive also to FM2. The association found between reactions to FM1 and HICC is also commonly reported and could represent a concomitant sensitization following increased exposure to fragrance allergens. These data confirm the importance of HICC introduction in the baseline patch test series.

Keywords: Contact dermatitis, hydroxyisohexyl 3-cyclohexene carboxaldehyde, patch test

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Introduction

Hydroxyisohexyl 3-cyclohexene carboxaldehyde (HICC), also known as Lyral®, is one of the fragrances published in the Fenn Study in 1989 (1). Since then, it is a widely used synthetic fragrance found in personal care and household products. The frequency of HICC as an ingredient in these products is quoted as being between 33% and 46% in European countries. It is an aldehyde, lipophilic enough to penetrate the skin and is a frequent cause of contact sensitization (2). Over the past decade, routine patch testing has shown that 1.5–3% of eczema patients have positive patch tests to HICC, making it a common contact allergen throughout Europe (3–5). Therefore, it has been included in the European baseline patch test series (6). Also, the use of HICC in cosmetic products was unrestricted until 24 April 2003. At that time, a limit of 1.5% in both leave-on and rinse-off products were set by the International Fragrance Association (7). The rationale behind this limit is unknown, but some reports suggest that this intervention has not had any effect (8). In this study, the authors describe the frequency of contact allergy to HICC in a Contact Dermatitis Unit, after its inclusion in baseline patch test series.

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Methods

A retrospective study including all patients submitted to patch test, from January 2007 to December 2009. Epicutaneous tests were applied on the upper back during 2 days using Finn Chambers®, and a positive patch test reaction was defined according to International Contact Dermatitis Research Group (ICDRG) guidelines (9). Readings were performed at 48 and 96 h. All patients were tested with the European baseline series (with additions from the Portuguese Contact Dermatitis Study Group).

Results

Over a 3-year period, 629 consecutive patients were patch tested. The frequency of positive reactions to HICC was 2.7% (17/629). All reactions were (+) or (++). Of the 17 patients with a positive reaction, 59% (10/17) were female and 41% (7/17) were male. The average age of all HICC positive reaction patients was 45 years old (mean 44.64; SD 14.90). Of the patients with a positive reaction, 35% (6/17) gave a history of atopy. The clinical diagnosis of eczema was made for all patients with positive reaction to HICC, localized in the face and neck in 58.8% (10/17), hands in 23.5% (4/17), axillae in 23.5% (4/17), trunk in 17.6% (3/17) and generalized in 6% (3/17). All patients were patch positive for more than one allergen: all (17/17) positive to fragrance Mix 2 (FM2); 47% of the patients (8/17) positive to fragrance Mix 1 (FM1); and 23.5% of the patients (4/17) positive to Balsam of Peru. In 94% (16/17) of cases, the reaction was judged to be of current relevance for products used in personal hygiene like perfumes, deodorants and hair conditioners.

Discussion

The frequency of positive reactions to HICC of 2.7% found in our population is according to what is described in several European reports (1.5–3%) (2–4), where HICC is still widely used as a fragrance ingredient. In contrast, in North America, the prevalence was found to be only 0.4%, which was considered to be mainly because of the presence of the ingredient in higher concentrations in deodorants in the EU compared with the USA (10,11).

All the patients from our study that were positive to HICC were positive to FM2, what is expected since HICC belongs to the mix present in FM2. Also, from the HICC positive patients, 47% were positive to FM1. This association found between reactions to FM1 and HICC in our series is also commonly reported in several reports and could represent a concomitant sensitization following increased exposure to fragrance allergens (5).

These data support current reports that HICC is a common allergen and confirm the importance of HICC introduction in the baseline patch test series.

Declaration of interest

The authors report no declarations of interest.

References

1. Fenn RS. Aroma chemical usage trends in modern perfumery. Perfumer Flavorist 1989;14:1–10.
2. Frosch PJ, Johansen JD, Menné T, Rastogi SC, Bruze M, Andersen KE et al. Lyral is an important sensitizer in patients sensitive to fragrances. Br J Dermatol 1999;141:1076–1083.
3. Geier J, Brasch J, Schnuch A, Lessmann H, Pirker C, Frosch PJ; Information Network of Departments of Dermatology (IVDK) and the German Contact Dermatitis Research Group (DKG). Lyral has been included in the patch test standard series in Germany. Contact Derm 2002;46:295–297.
4. Baxter KF, Wilkinson SM, Kirk SJ. Hydroxymethylpentylcyclohexene-carboxaldehyde (Lyral) as a fragrance allergen in the UK. Contact Derm 2003;48:117–118.
5. Bruze M, Andersen KE, Goossens A; ESCD; EECDRG. Recommendation to include fragrance mix 2 and hydroxyisohexyl 3-cyclohexene carboxaldehyde (Lyral) in the European baseline patch test series. Contact Derm 2008;58:129–133.
6. International Fragrance Associations. IFRA standards. 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC) January 2003 (available from www.ifraorg.org). Accessed on 4 June 2008.
7. Braendstrup P, Johansen JD; Danish Contact Dermatitis Group. Hydroxyisohexyl 3-cyclohexene carboxaldehyde (Lyral) is still a frequent allergen. Contact Derm 2008;59:187–188.
8. Rietschel RL, Fowler Jr., JF. Practical aspects of patch testing. In: Rietschel RL, Fowler Jr., JF, eds. Fisher's Contact Dermatitis. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2001. pp. 9–26.
9. Belsito DV, Fowler JF Jr, Sasseville D, Marks JG Jr, De Leo VA, Storrs FJ. Delayed-type hypersensitivity to fragrance materials in a select North American population. Dermatitis 2006;17:23–28.
10. Handley J, Burrows D. Allergic contact dermatitis from the synthetic fragrances Lyral and acetyl cedrene in separate underarm deodorant preparations. Contact Derm 1994;31:288–290.
11. Hendriks SA, Bousema MT, van Ginkel CJ. Allergic contact dermatitis from the fragrance ingredient Lyral in underarm deodorant. Contact Derm 1999;41:119.