

Allergic contact dermatitis, mimicking atopic dermatitis, associated with the use of essential oils in “home-made” cosmetics and aromatherapy diffusers

Laurine Sergoyne¹ | Michelle Mertens¹ | Ella Dendooven^{1,2} | Julie Leysen¹ | Olivier Aerts^{1,2} 

¹Department of Dermatology, University Hospital Antwerp (UZA), Antwerp, Belgium

²Research group Immunology, Infla-Med Centre of Excellence, University of Antwerp, Antwerp, Belgium

Correspondence

Olivier Aerts, Department of Dermatology, University Hospital Antwerp (UZA), Wilrijkstraat 10, B-2650 Antwerp, Belgium.
Email: olivier.aerts@uza.be

KEYWORDS: airborne, aromatherapy, atopic dermatitis, case report, essential oil, eyelid dermatitis, homemade cosmetics, lavender, linalool, systemic allergic dermatitis

Patients with atopic dermatitis (AD) may develop additional contact allergies, for example to fragrances.^{1,2} Therefore, a high level of suspicion is required when such patients present with therapy-resistant AD. Here we report a young girl with allergic contact dermatitis from linalool, initially mistaken for a flare-up of AD. We also highlight new, and perhaps overlooked, allergen sources of this sensitizer.

CASE REPORT

A 10-year-old atopic girl was referred because of a 2-year history of severely itchy dermatitis. This had started as facial and periorcular eczema, the latter accompanied by a strong and intermittent swelling of the eyelids, which had led to the formation of residual milia cysts (Figure 1A,B). Thereafter, her scalp, neck, parts of her upper trunk, and main body folds had also become affected. As AD with a “head-and-neck” distribution had initially been considered, topical therapies had been tried and when these had failed, systemic treatment with oral cyclosporine (2.5 mg/kg/d, progressively increased to 5 mg/kg/d) had been initiated. These therapies had, however, only resulted in minimal improvement. Because of the therapy-resistance and the remarkable involvement of the eyelids, the diagnosis of AD was questioned and the girl was scheduled for patch tests.

An abbreviated baseline series for children, including hydroperoxides of linalool 1% pet., was applied on the upper back using AllergEAZE patch test chambers (SmartPractice, Calgary, Canada). Following an occlusion of 2 days with Fixomull Stretch (BSN Medical, Hamburg, Germany), the tests were read on day (D) 2 and D4, in accordance with ESCD guidelines.³ On D4, positive patch test reactions were observed to fragrance mix II 14% pet. (+), linalool hydroperoxides 1% pet. (++), and amercol L-101 50% pet. (+). Methylisothiazolinone (MI) 0.2% aq.,

potassium dichromate 0.5% pet., and a body lotion resulted in only doubtful (?+) patch test reactions. The observed reactions to fragrances were considered relevant as many of the child's skin care products (shower gel, shampoo, and facial moisturizer) were perfumed. Interestingly, when specifically discussing linalool as a major component of lavender,⁴ the mother informed us that, shortly before the dermatitis had started, she had begun to use aromatherapy with essential oils to treat the asthma of our patients' brother.⁵ She had installed electric ultrasonic diffusers, often with lavender-based essential oils, in the living room and bedrooms. Moreover, she had used lavender oil to make “home-made” cosmetics, such as an oil to treat dry scalp, and several (laundry) detergents. No clear relevance could be found concerning amercol L 101, chromium, nor MI, although concerning the latter, and taking into account the clinical presentation, an airborne and systemic allergic dermatitis due to MI was considered.^{6,7} Allergic contact dermatitis to fragrances, and to linalool in particular, from direct, airborne and, possibly, systemic (respiratory) exposure, was thus diagnosed. Indeed, airborne exposure probably contributed to the striking periorcular involvement, whereas the occurrence of dermatitis at the main body folds, mimicking AD, might have been an example of systemic allergic dermatitis from inhalation.⁶ We advised the patient to avoid the proven contact allergens and to stop the use of home-made cosmetics and essential oil diffusers. When contacted 9 months later, the mother confirmed to us that the severe dermatitis had completely resolved, but that the girl still suffered occasionally, as before, from mild AD.

DISCUSSION

Linalool, a fragrance terpene present in many cosmetics and household products, and a major component of lavender, is a well-known



FIGURE 1 (A,B) Severe eyelid dermatitis, accompanied by intermittent swelling and the formation of milia cysts in a girl with contact-allergy to linalool. Lavender-based aromatherapy “diffusers”, among others, were pinpointed as relevant culprit allergen sources

cause of (airborne) allergic contact dermatitis.^{4,8,9} We report this case to highlight that electronic ultrasonic diffusers and “home-made” cosmetics and remedies may well be overlooked allergen sources of this sensitizer.¹⁰ Moreover, this case illustrates that patch tests need to be considered in patients with (therapy-resistant) AD, and preferably before a systemic treatment is initiated. A dermatitis with a “head-and-neck” distribution, and/or strong involvement of the eyelids, should alert the clinician to consider volatile allergens, and, when the main body folds are affected, also systemic allergic dermatitis through inhalation should be among the differential diagnoses.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

Laurine Sergoyne: Data curation; formal analysis; investigation; writing-original draft. **Michelle Mertens:** Data curation; formal analysis; investigation; writing-original draft. **Ella Dendooven:** Conceptualization; data

curation; formal analysis; investigation; methodology; writing-original draft. **Julie Leysen:** Data curation; formal analysis; investigation; supervision; validation; writing-original draft. **Olivier Aerts:** Conceptualization; data curation; formal analysis; investigation; methodology; supervision; validation; writing-review and editing.

ORCID

Olivier Aerts  <https://orcid.org/0000-0002-0076-2887>

REFERENCES

- Owen JL, Vakharia PP, Silverberg JL. The role and diagnosis of allergic contact dermatitis in patients with atopic dermatitis. *Am J Clin Dermatol*. 2018;19(3):293-302.
- Lubbes S, Rustemeyer T, Schuttelaar MLA, Sillevs Smitt JH, Middelkamp-Hup MA. Contact allergy in children with and without atopic dermatitis; which are the frequent allergens? *Nederlands Tijdschrift voor Dermatologie en Venereologie*. 2014;24(1):39-40.
- Johansen JD, Aalto-Korte K, Agner T, et al. European Society of Contact Dermatitis guideline for diagnostic patch testing - recommendations on best practice. *Contact Dermatitis*. 2015;73(4):195-221.
- de Groot A. Linalool hydroperoxides. *Dermatitis*. 2019;30(4):243-246.
- Ueno-Iio T, Shibakura M, Yokota K, et al. Lavender essential oil inhalation suppresses allergic airway inflammation and mucous cell hyperplasia in a murine model of asthma. *Life Sci*. 2014;108(2):109-115.
- Aerts O, Cattaert N, Lambert J, Goossens A. Airborne and systemic dermatitis, mimicking atopic dermatitis, caused by methylisothiazolinone in a young child. *Contact Dermatitis*. 2013;68(4):250-251.
- Amsler E, Aerts O, Raison-Peyron N, et al. Airborne allergic contact dermatitis caused by isothiazolinones in water-based paints: a retrospective study of 44 cases. *Contact Dermatitis*. 2017;77(3):163-170.
- Bingham LJ, Tam MM, Palmer AM, Cahill JL, Nixon RL. Contact allergy and allergic contact dermatitis caused by lavender: a retrospective study from an Australian clinic. *Contact Dermatitis*. 2019;81(1):37-42.
- Dittmar D, Schuttelaar MLA. Contact sensitization to hydroperoxides of limonene and linalool: results of consecutive patch testing and clinical relevance. *Contact Dermatitis*. 2019;80(2):101-109.
- Grey KR, Hagen SL, Warshaw EM. Essential oils: emerging “medicaments”. *Dermatitis*. 2016;27(4):227-228.

How to cite this article: Sergoyne L, Mertens M, Dendooven E, Leysen J, Aerts O. Allergic contact dermatitis, mimicking atopic dermatitis, associated with the use of essential oils in “home-made” cosmetics and aromatherapy diffusers. *Contact Dermatitis*. 2020;1-2. <https://doi.org/10.1111/cod.13580>