CASE REPORT

Occupational contact dermatitis to acrylates in a manicurist

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Abstract

We report the case of a manicurist who developed an allergic skin reaction to acrylates, manifested by bullous lesions on fingertips and eczema of the hands and ears. Patch tests showed positive reactions to 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, ethyleneglycol dimethacrylate, triethyleneglycol dimethacrylate, 1,6-hexandiol diacrylate, 2-hydroxyethyl acrylate and triethylene-glycol diacrylate. Because of her skin disorder, she had to give up her job. She was not correctly advised on retraining and started to work as a dental nurse. Soon after re-exposure to acrylates in dental materials, she experienced recurrence of the skin symptoms.

Key words

Acrylates; dental nurse; manicurist; occupational contact dermatitis.

Introduction

Occupational exposure of beauticians and manicurists to acrylate-containing nail cosmetics may induce both allergic and irritant reactions [1–3]. Coexisting allergic and irritant contact dermatitis are rarely reported. Here, we present the case of a manicurist who developed irritant and allergic skin reactions, affecting the ears and hands, to acrylates used in applying artificial fingernails.

Case report

A 32-year-old non-atopic women, who had been working as a manicurist for 3 months, developed redness and oozing skin lesions of the ears and external auditory canals, followed by hand eczema and bullous lesions on fingers (Figure 1—image taken by the patient herself). Skin symptoms were accompanied by nasal pruritus, rhinorrhea and redness of the conjunctiva. As a manicurist, she handled nail tips, gel, acrylic artificial nails and nail lacquer. According to material safety data sheets, she used gels containing monofunctional and multifunctional acrylate/methacrylate monomers/oligomers, powders containing ethyl methacrylate/methyl methacrylate copolymers and primers based on methacrylic acid, but the specific identity of the ingredients was not revealed by the manufacturer for reasons of commercial secrecy. Preparations were applied according to manufacturers’ instructions, and she usually wore latex gloves at work. Because of her skin disorder, she had to give up her job. After completing dermatological treatment, she started working as a dental nurse. In this work, she was exposed to materials containing, among others, bisphenol A-glycidyl methacrylate (BIS-GMA), 2-hydroxyethyl methacrylate (2-HEMA), urethane dimethacrylate, triethyleneglycol dimethacrylate (TREGDMA), methylmethacrylate and 4-methacryloyloxyethyl trimellitate anhydride. Within 4 months, itching skin lesions of the ears and eczema of the fingers reappeared, obliging her to change her job again and work as a secretary.

We performed patch tests with the European Baseline Series, (Meth) Acrylate Series (Nails-Artificial), Fragrance Series, glutaraldehyde, benzalkonium chloride, chlorhexidine digluconate (Chemotechnique®, Vellinge, Sweden) and disinfectant solutions prepared by our laboratory—0.5% chloramine and 2% glyoxal. Positive results of patch tests at Days 2 and 4 are given in Table 1. There were no immediate responses (20–30 min), but after 24h of exposure to patch tests, the patient complained of itching ears and exudation from the auditory canals. Ear, nose and throat examination confirmed the presence of skin inflammation. Immediate allergy to common aeroallergens, including house dust mites, pollens, fungi and latex, was tested by skin prick tests, with negative results.
Dermal exposures to acrylates usually induce type IV hypersensitivity reactions, manifesting mostly as hand (especially fingertip) eczema. Allergy to nail cosmetics may result in ectopic dermatitis when the hands transfer a small amount of allergen to distant areas of skin. This may also occur in cases of airborne exposure to skin allergens [4]. Ectopic reactions rarely occur together with acrylate sensitivity [3,4], but cases of airborne occupational dermatitis to acrylates have been reported both in beauticians and in dentists [5–7]. In our patient, short (3 months) occupational exposure to nail cosmetics and later contact with dental materials resulted in contact allergy to acrylates with numerous positive patch test reactions. It is difficult to assess them as primary, concomitant or cross reactions or even reactions to the impurities of preparations, in particular, because of the lack of detailed information about components of products used in the beauty salon. Acrylic monomers cross react, and sensitized individuals are often multiallergic [8]. Moreover, cross-sensitivity varies greatly between people [9]. Because previous non-occupational exposure to acrylates in our patient was excluded, it may be assumed that primary sensitization was caused by at least one of the monomers usually responsible for positive reactions to artificial nails, i.e. 2-hydroxyethyl acrylate or 2-HEMA, EGDMA and/or TREGDMA [9,10]. Localization of skin lesions within the ears may be explained by allergen transfer to the skin of ears. Interestingly, ectopic ear dermatitis preceded occurrence of hand skin lesions.

Acrylate monomers (including residual unpolymerized monomers in the sculptured nails) may also be responsible for toxic reactions. For instance, methacrylic acid used in primer for acrylic nails may even produce third-degree burns [4]. The large fingertip bullae in the reported case should be interpreted as a toxic irritant, rather than an allergic, reaction.
Immediate reactions, such as rhinoconjunctivitis and asthma caused by these chemicals have also been reported [11], but it is not clear if hypersensitivity (type I or IV) or irritation underlies these symptoms [12]. We presume the nasal and ocular symptoms in the reported case were also related to acrylates.

In successful retraining and redeployment of individuals allergic to acrylates, the presence of these chemicals in various workplaces (e.g. in dentistry, beauty salons, printing industry and construction industry) should be considered. Otherwise, as in this case, re-exposure to acrylates in a new job may cause recurrence of the skin disorder.

**Key points**

- This is a case of rarely reported co-existing symptoms of allergic and irritant contact dermatitis caused by acrylates.
- Change of occupation without identifying the causative factors of occupational contact dermatitis may lead to re-exposure to the same harmful agents in a new occupation and recurrence of skin disorder.

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**Conflicts of interest**

None declared.

**References**