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Site-related contact urticaria from phenoxyethanol

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Two unusual cases of contact urticaria (CU) from phenoxyethanol, after the application of cosmetics containing this preservative are reported. The peculiarity of these reactions is that they occur when the product is applied on the face and not on other skin sites.

CASE REPORTS

A 26-year-old non-atopic male requested a dermatological evaluation due to an erythematous-edematous itching and burning dermatitis of his face following the application of a hydrating fluid (Jaluronius®).

A 32-year-old female, with a history of allergic rhinitis and atopic dermatitis in childhood, reported itching pomphoid erythema on her face after the use of a moisturising and soothing serum (Hydralen®).

In both cases, the manifestations appeared between 10 and 20 min after the application and disappeared after about 45 min.

A clinical diagnosis of CU was performed in both patients.

Comparing the ingredients contained in the two products, 2-phenoxyethanol (CAS 122-99-6), anhydrous citric acid (CAS 77-92-9) and sodium benzoate (CAS 532-32-1) appeared to be in common.

Patch tests were performed on the back with the baseline Italian SIDAPA series, the three ingredients at different concentrations (2-phenoxyethanol 1% and 5% pet., anhydrous citric acid 0.25%, 0.50%, 1% aq., sodium benzoate 0.25%, 0.50%, 1% aq.) and the patients' own products.

Readings at 15 and 30 min, day 2 and day 3 were negative in both patients for all the tests.

The recommended test for CU is the 'open test',[1] so it was performed on both patients on the extensor side of the upper arm with patients' own products and the three ingredients at different concentrations, with a negative result.

Since CU occurred on the face, open tests were also carried out on the forehead with the same products and modalities. Both patients showed a positive reaction with itching edema and erythema after 15 min with their own product. With the same timing, a positive reaction to 2-phenoxyethanol 1% and 5% pet. was observed in Case 1 (Figure 1). Case 2 showed only a lower intensity reaction to 2-phenoxyethanol 5% pet. (Figure 2).

FIGURE 1 Case 1: Pomphoid cutaneous reactions due to application of Jaluronius® (right hemiforehead) and 2-phenoxyethanol 5% pet. (left hemiforehead).

FIGURE 2 Case 2: Pomphoid cutaneous reactions due to application of Hydralen® (right hemiforehead) and 2-phenoxyethanol 5% pet. (left hemiforehead).

The same open tests with the patients' own products and all the ingredients were performed in 10 healthy controls, resulting negative both on the back and the forehead.

DISCUSSION

Phenoxyethanol or 2-phenoxyethanol is an aromatic alcohol with antimicrobial properties, commonly used as a preservative in cosmetics, vaccines, and wound care medications. Its maximum concentration allowed in both rinse-off and leave-on products is 1%.[2] It is currently considered a rare allergen, having a frequency of positivity in patch tests varying from 0.2 to 0.24%.[3] It can be responsible for CU; nine cases, excluding ours, have been described in the literature, caused not only by cosmetics like emollients, make-up, soaps, but also by ultrasound gel.[4]

CU is a cutaneous response with a wheal formation within 30 min after the application of a product. It lasts some hours, leaving no persisting signs.[1]

The mechanism of CU may be immunologic (ICU) or non-immunologic (NICU).[1,5] CU from phenoxyethanol is considered immunological,[5] and the absence of specific antibodies demonstrating IgE-mediated reactions does not deny this supposed mechanism.[3]

It cannot be excluded that other mechanisms responsible for NICU may be involved, such as a non-antibody-mediated release of histamine, prostaglandins, leukotrienes, or substance P, which may cause a vasodilation of dermal vessels.[1,6]

One notable aspect is the varying cutaneous reactivity of different body areas to the same substance: the face was much more reactive than the back. This can be attributed to the thinness and rich vascularity of the facial area, making it more permeable.[7] Appendage density and different sebaceous gland concentrations could contribute to these variations.[8]

The variability in immune mechanisms and cutaneous reactivity of different anatomical sites to substances like phenoxyethanol are crucial for explaining potential intolerance to cosmetics.

AUTHOR CONTRIBUTIONS

Elisa Marzola: Writing – original draft. **Lorenzo Melloni:** Writing – original draft. **Alessia Caligiure:** Writing – original draft. **Federico Gianessi:** Writing – original draft. **Anna Bianchi:** Resources. **Alessandro Borghi:** Writing – review and editing. **Monica Corazza:** Writing – review and editing; conceptualization.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

INFORMED CONSENT

Informed consent was signed by the patients for the publication of medical data and acquisition of photographic material.

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