Occupational allergic contact dermatitis caused by N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate in a dental assistant

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N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate is a quaternary ammonium compound that is used to disinfect medical devices. Occupational allergic contact dermatitis caused by quaternary ammonium compounds in healthcare workers is an increasingly important issue (1). We report a case of severe allergic contact dermatitis caused by N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate after occupational exposure, which seems to be very uncommon.

Case Report

A 42-year-old woman who had worked for >10 years in a dental clinic developed eczematous lesions on her right wrist (Fig. 1) with severe pruritus, after cleaning medical devices with Darodor Sinaldehyd 2000® [N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine and N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate]. Darodor Sinaldehyd 2000® is a new aldehyde-free disinfectant product; used for cleaning and disinfecting medico-surgical instruments. The normal use dilution of the product is 1:12 in water.

Fig. 1. Eczema on the right wrist.

The eruption consisted of small papules and vesicles, with an intense erythema affecting the right wrist and eyelids. The patient had no airway symptoms. Despite the use of gloves, the skin lesions had been developing over the previous 8 months, and recurred quickly after treatment with topical corticosteroids had been stopped.

The patient was patch tested with the Spanish GEIDAC series, under conventional conditions, with negative results. Darodor Sinaldehyd 2000® and its separate components, which had been supplied by the manufacturer, were also tested, at concentrations of 1% and 5% pet. Patch tests were performed according to
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Table 1. Positive patch test results

<table>
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<tr>
<th>Patch tests</th>
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<tr>
<td><strong>Readings</strong></td>
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<tr>
<td>D2</td>
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<tr>
<td>N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate 5% pet. (CAS no. 94667-33-1)</td>
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<tr>
<td>N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine 5% pet. (CAS no. 2372-82-9)</td>
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<tr>
<td>–</td>
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<tr>
<td>Darodor Sinaldehyd 2000® 1% pet.</td>
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The interpretation key is based on recommendations by the International Contact Dermatitis Research Group: –, negative reaction; +, erythema and infiltration; ++, erythema, infiltration, papules, and discrete vesicles.

ICDRG criteria, with Finn Chambers® on Scanpor® tape. The patches were removed after 2 days, and readings were made on D2 and D4 (Table 1).

Patch tests showed positive reactions to 1% Darodor Sinaldehyd 2000® and to 5% N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate (Fig. 2). Patch testing with Sinaldehyd 2000® and its separate components in 10 healthy controls gave negative results.

On the basis of the clinical history and the positive patch test results, a diagnosis of occupational allergic contact dermatitis caused by N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate was made. After avoiding contact with this disinfectant product, the patient remained symptom-free.

Discussion

Patients exposed to detergents, disinfectants and antiseptics represent an important proportion of occupational dermatology consultations (2). N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate is a quaternary ammonium compound that is used for disinfecting surgical instruments and as a wood preservative, owing to its low corrosiveness. Reactions to N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate seem to be extremely uncommon.

Contact dermatitis caused by quaternary ammonium compounds has already been reported, especially for benzalkonium chloride (3). Also, quaternary ammonium compounds have been associated with asthmatic symptoms, but the mechanism is unknown (4). Disinfectants based on quaternary ammonium compounds should be considered as a possible, although unusual, cause of contact allergy in healthcare workers, and this is an increasingly important issue (1).

To our knowledge, this is only the second case of allergic contact dermatitis caused by N,N-didecyl-N-methyl-poly(oxyethyl) ammonium propionate (5), and is the first case proven by patch testing.

References