

known. Nevertheless, it is often difficult to find the causative allergen. Life-threatening allergic reactions are often caused by nuts. Moreover, nuts are often suspected due to their widespread availability and hidden occurrence in food

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**IgE-mediated allergy in an otherwise nonatopic patient.**

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preparations. Therefore, routine diagnosis considers those highly allergenic foods (e.g., hazelnuts, walnuts, and almonds) as well as pollen allergens.

We report on a 52-year-old patient who developed epigastric pain, angioedema, and respiratory distress a few minutes after eating a piece of poppy cake. It was the first such attack in his life and he required emergency care. He neither reported any similar previous adverse reaction to foods, nor did he suffer from any other serious disease. With regard to atopic symptoms, the presented patient did not complain of allergic rhinitis, asthma, or atopic eczema. The family history was also negative for atopy.

The diagnosis of poppy-seed allergy was confirmed by skin tests (prick) and specific IgE antibodies (RAST; specific IgE was 1.69 IU/ml, class 2). In the skin tests, an immediate type-I sensitivity to nuts (hazelnuts, walnuts, and almonds) without clinical relevance was detected as well. The patient did not report clinical symptoms of allergic rhinoconjunctivitis or oropharyngeal symptoms after consumption of special food products such as nuts and fruits. The prick tests were positive with raw and baked poppy seed, suggesting the thermostability of the relevant antigen.

Pollen-associated allergies to food preparations are more common in Europe than food allergies without any association with atopic symptoms, especially allergic rhinitis (1). Reports of allergic type-I sensitivity to poppy seed are rare. A member of the Papaveraceae family, the poppy flower grows as a weed in cereal fields and along country roads. Clinical symptoms in allergic patients may affect the skin, mucosa, and

bronchial and gastrointestinal tract, as with other food allergens. According to the literature, severe reactions often occur, affecting mainly atopic patients (2–6).

Anaphylactic reactions after consumption of poppy cake were first reported by Wagner & Ring (2). The clinical symptoms ranged from itching around the mouth and lips, nausea, and dyspnea to anaphylactic reactions. The diagnosis was confirmed by prick test and RAST. As in our patient, positive skin reactions to several nut allergens were found, probably representing cross-reactivity between nuts and poppy seed. In 1997, Gamboa et al. (7) reported on an atopic patient who presented with a history of contact urticaria and angioedema after contact with poppy flowers.

Sensitization to poppy seed probably does not need special exposure. Reports of sensitizations already in childhood suggest that a genetic determination is important.

It is still unclear why in the reported cases poppy-seed allergy coincides with nut allergy. It is conceivable that in some cases sensitization to poppy allergens may occur by the more common nut allergens. On the other hand, at least in Germany, the use of poppy seed for cakes is common.

By this case report, we underline the necessity of an exact food anamnesis and emphasize the possibility of poppy-seed allergy, especially if one can find positive skin tests to nuts with lack of clinical relevance.

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## Chlorendic anhydride allergy

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**Key words:** allergy; asthma; contact urticaria; IgE antibodies; organic anhydrides; phthalic anhydride.

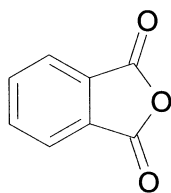
● In June 1997, a 47-year-old mechanic began to repair old painted forest harvesters by metal-inert-gas (MIG) welding. Next autumn, he experienced immediate erythema and edema of the face and later also dyspnea when welding. Peak expiratory flow (PEF) follow-up (twice a day) showed 22% PEF variation during one work day. Slight bronchial hyperreactivity was found. The symptoms diminished during other work but returned when the subject was exposed in welding again.

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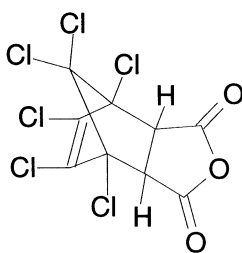
**A new anhydride to add to the list of allergens in paints.**

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Our examinations showed normal clinical status. Bronchial hyperreactivity had disappeared. Skin prick tests with common



Phthalic anhydride



Chlorendic anhydride

Figure 1. Structural formulas.

environmental allergens were negative. PEF surveillance pointed strongly to occupational asthma. He had been briefly exposed to the paint fumes for about 10 s, leading to immediate dyspnea, erythema, and edema of the face, and a fall in PEF of 30% (610–430 l/min) and 41% (590–350 l/min). The diurnal PEF variation was <10% during other work days and on days off.

In the material safety data sheets of the two-component paint, only two solvents were given. According to the manufacturer, the hardener contained 65% chlorinated polyester and the paint contained 0.9% alkyd resin. Both phthalic anhydride (PA) and chlorendic anhydride (CA) were identified in the fumes generated from the heated paint (1).

CA-HSA-conjugate (1%) induced a positive reaction in the skin prick test and also in the open test. Skin prick tests with several common sensitizing acid anhydride-HSA conjugates were positive. Specific IgE antibodies against CA-HSA-conjugate were found (Phadebas RAST<sup>®</sup>) against all the other sensitizing anhydrides except trimellitic anhydride.

On the basis of these investigations, we diagnosed contact urticaria due to CA and occupational asthma due to the welding fumes of a polyester paint containing PA and CA.

Organic acid anhydrides are used as hardeners of epoxy resins and in the manufacture of alkyd and polyester resins. Several anhydrides have been shown to cause IgE-mediated allergies (2).

CA (Fig. 1, FW 370.86, CAS 115-27-5) is used as a starting agent and a flame retardant for polyester in paints and fiber glass-reinforced plastics. According to a skin sensitization study in guinea pigs, CA has been considered a possible skin-sensitizing agent. No data concerning its effects on man are available (3).

The present case report is the first description of sensitization to CA, which should be added to the list of sensitizing anhydrides. The presence of organic acid anhydrides in the fumes of polyester paints should be borne in mind and included in the material safety data sheets.

The exposure levels at the workplace will be measured, and immunologic investigations of the other workers will be carried out.

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