

Contact Urticaria due to Dinitrochlorobenzene

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A 33-year-old man with alopecia totalis presented with facial erythema and flares, conjunctival injection, and dyspnea developed within several minutes following the ninth application of dinitrochlorobenzene (DNCB). A scratch skin test produced positive reactions in concentrations of 0.01, 0.05, 0.1% DNCB showing flares and wheals, whereas concentrations of 0.001, 0.01, 0.05% diphenylcyclopropanone (DPCP) showed negative results.

Contact urticaria due to DNCB is very rare, but this complication must be fully noted because of the widespread and frequent use of DNCB in dermatotherapeutic fields.

We report herein a rare case of contact urticaria following topical application of DNCB in the treatment of alopecia totalis. (*Ann Dermatol* 9:(3) 191~193, 1997).

Key Words : Contact urticaria, Dinitrochlorobenzene (DNCB)

Contact urticaria refers to a wheal-and-flare response elicited within 15 to 30 minutes after cutaneous exposure to certain agents^{1,2}. It may be non-immunologic (no prior sensitization), immunologic (allergic), or of unknown mechanism. The non-immunologic type is the commonest, and may be due to direct release of vasoactive substances from mast cells. The allergic type may be the most severe, as anaphylaxis is possible. The third type has features of both.

Dinitrochlorobenzene (DNCB) is a widely used immunotherapeutic agent. Side effects are sometimes noted such as erythema, pigmentation, burning sensation, localized adenopathy and generalized eczema³. However, contact urticaria due to DNCB is a rare unwanted side effect, and only a few cases have been reported in the literature^{4,7}.

We report an additional case of contact urticaria due to DNCB.

CASE REPORT

A 33-year-old man was referred to our clinic with alopecia totalis, which had begun developing three months prior to his visit. The family history appeared to be non-contributory. Physical examination revealed diffuse hair loss over his entire scalp. The results of the following laboratory tests were within the normal range or were negative : CBC, LFT, urinalysis, EKG, chest PA, VDRL. We applied dinitrochlorobenzene (DNCB) on his scalp weekly at concentrations ranging from 0.02% to 0.13%. Facial erythema and flares, conjunctival injection and dyspnea developed within several minutes following the ninth application of DNCB (Fig. 1).

A scratch skin test produced positive reactions in concentrations of 0.01, 0.05, 0.1% DNCB showing flares and wheals, whereas concentrations of 0.001, 0.01, 0.05% diphenylcyclopropanone (DPCP) showed negative results (Fig. 2). We changed the immunotherapeutic agent to DPCP and there was no recurrence of similar lesions over the next 12 months.

DISCUSSION

The term contact urticaria most frequently refers to a wheal-and-flare response elicited within 15 to 30

Received October 7, 1996.

Accepted for publication March 25, 1996.

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Fig. 1. Erythematous flares on the face and conjunctival injection developed within several minutes after DNCB application.

minutes after cutaneous exposure to certain agents^{1,2}. Various foods, plants, animal products, physical influences, textiles, cosmetics and industrial contactants have been reported to elicit contact urticaria.

Dinitrochlorobenzene (DNCB) is an immunotherapeutic agent for alopecia areata, verrucae and molluscum contagiosum³. Side effects of DNCB therapy include erythema, allergic contact dermatitis, irritation, local adenopathy, generalized eczema, depigmentation and burning sensations. However, contact urticaria to DNCB is very rare, and only a few cases have been reported in the literature^{4,7}. In these cases, this reaction developed three months or 18 months after challenge with DNCB. In the present case, this reaction developed two months after challenge with DNCB.

Clinical features of contact urticaria may vary in morphology and severity^{8,9}. In mild cases, itching, tingling, or burning sensations accompanying the erythema may occur. In typical contact urticaria, local wheal-and-flare reactions may be seen. In severe and more advanced cases, generalized urticaria and extracutaneous symptoms such as bronchial asthma, rhinoconjunctivitis and anaphylactic reactions may occur. In previous reported

Fig. 2. Scratch skin test showed positive reactions in concentrations of 0.01, 0.05, and 0.1% DNCB, but not in 0.001, 0.01, and 0.05% DPCP.

cases, generalized urticaria, pruritus, dyspepsia, dyspnea and eyelid swelling were noted. In the present case, the patient experienced conjunctival injection and dyspnea in addition to facial flares and erythema within several minutes after the application of DNCB.

Contact urticaria may be subdivided into three major groups on the basis of pathogenetic mechanisms involved: immunologic (allergic), nonimmunologic (primary urticariogenic), and those of uncertain mechanism^{1,8,10}.

Immunologic contact urticaria is an immediate hypersensitivity reaction in people who have previously been sensitized to the causative agent. In skin challenges, the molecules of a contact reactant penetrate through the epidermis and react with specific IgE molecules attached to mast cell membranes. The cutaneous symptoms of contact urticaria are elicited by vasoactive substances, mainly histamine released from the mast cells. The role of histamine is crucial, but other inflammatory mediators such as prostaglandins, leukotrienes and kinins may also play some roles⁸. Foodstuffs are the most common causes of allergic contact urticaria⁹.

Nonimmunologic contact urticaria is the most common type of contact reaction and occurs without previous sensitization in most exposed persons. The reaction remains localized and neither spreads to become generalized urticaria nor causes systemic symptoms. A wide variety of chemical compounds release histamine and other vasoactive substances to the skin without involving immuno-

logic processes. These include benzoic acid, sorbic acid, cinnamic acid, cinnamic aldehyde and nicotinic acid esters⁸.

Contact urticaria of uncertain mechanism refers to reactions elicited by chemicals for which neither an immune nor a direct action on vessels or release of vasoactive substances can be proven currently⁷. Ammonium persulfate, used in hair bleaches, is the classic example¹⁰.

In the present case, the possible mechanism may be immunologic because there was a previous sensitization history of DNCB, a concomitant occurrence of systemic symptoms, and a positive scratch skin test result to concentrations of 0.01, 0.05, and 0.1% DNCB.

Contact urticaria due to DNCB is very rare, but this complication must be fully noted because of the widespread and frequent use of DNCB in dermatotherapeutic fields.

We report herein a rare case of immunologic contact urticaria induced by topical applications of DNCB.

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