

Sensitization to aluminium by aluminium-precipitated dust and pollen extracts

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We report 2 cases of aluminium sensitivity in adults. Each time, the means of sensitization was the inoculation of aluminium-precipitated pollen or dust extracts for hyposensitization. We conclude that aluminium allergy is not exceptional and that in these cases one can observe allergic reactions to the Finn Chamber® tests.

Key words: aluminium hypersensitivity; Finn Chambers®; hyposensitization therapy; persistent nodules; adults.

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Reported cases of aluminium sensitization are rare and aluminium (Al) is considered a weak allergen. Yet its use in preparations for immunization and hyposensitization has greatly increased the number of allergic cutaneous responses. 2 recent reports (1, 2) have mentioned Al reactions in infants after using such preparations in no fewer than 14 cases. We have observed 2 similar cases in adults.

Case Reports

Case no. 1

A 57-year-old female post office worker was hyposensitized with Al-hydroxide-precipitated Alipagène® dust between October 1981 and January 1982. In July 1982, she developed pruritus of the extensor aspects of the arms. Nodules at the injection sites were then clinically detected.

She was patch tested with the ICDRG standard series: all tests proved negative, but we noted erythematous rings at each Finn Cham-

ber® test site. Al and some of its salts were then tested with Leukotests®, with the following results: Al powder 2% aq. —; Al acetate 2% aq. —; Al chloride 2% aq. +; Al sulfide 2% aq. —.

She was not regularly exposed to Al salts at work, and did not use antiperspirants or topical preparations containing Al salts.

No treatment whatsoever was effective for the pruritus, so she was eventually submitted to surgical removal of all 3 nodules. All her symptoms then disappeared.

A nodule showed histologically an eczematous appearance in the epidermis and at the injection site, and in the deep dermis and hypodermis, a predominantly inflammatory infiltrate similar to that in strong immunological reactions.

For chemical analysis of nodule tissue, skin samples were frozen, lyophilized and weighed, treated with 1 ml nitric acid at 130°C for 2 h, the residue placed in a 5 ml graduated flask with distilled water, and the amount of Al

measured by flameless atomic absorption spectrophotometry (Perkin-Elmer 300, HGA 72). In the nodule, 59000 μg Al per g of tissue was found, compared to only 33 μg Al per g of tissue in a control.

Case no. 2

Between 1984 and 1985, a 32-year-old female civil servant with allergic rhinitis was hyposensitized to Alipagène® dust and Allpyral® grass pollen, both precipitated on Al hydroxide. In May 1985, nodules appeared on the extensor aspects of the arms, with excruciating pruritus developing all over the arms.

All patch tests with Finn Chambers® were positive. The ICDRG standard series was carried out 2 months later with Leukotests® and was entirely negative. In contrast, strongly positive tests (vesicular) were obtained with: Al powder 2% aq.; Al chloride 2% aq.; Al sulfide 2% aq.; Al acetate 2% aq.

Histological examination of one nodule was similar to Case no. 1.

Since she never used antiperspirants or creams containing Al salts, the patch tests and clinical history clearly showed that hyposensitization had induced Al allergy.

Discussion

Al is considered a very weak allergen, no case being mentioned in (3). Fisher (4) refers to Al salts only as mild irritants. Cronin (5) reminds us that Al salts are used as antiperspirants. The pH of Al chloride ranges from 2.5 to 3, which explains its irritant potential.

Cases of Al allergy have been reported in industry but are not all agreed on. Hall et al. (6) tested 202 patients with suspected occupational dermatitis from working in aeronautics plants: only 4 of them had positive tests to Al. Clemmensen & Knudsen (7) pointed out the brevity of such test reactions, suggesting simple irritation. Fisher & Rystedt (8) tested 852 workers in the hard metal industry and reported 2 apparent positive reactions to Al, with red infiltrated rings from Finn Chambers®. Only in 1 patient was Al allergy con-

firmed, the source being an antiperspirant. Patch tests were positive with Al chloride (2 and 5%).

The topical use of Al acetotartrate (1% aq.) caused 2 cases (9): in both cases, Al and Al salts were positive as well as the Finn Chambers®. A 54-year-old female with hand eczema reacted to Finn Chambers® with red infiltrated rings (10). Patch tests to Al metal and chloride (1, 2, 5% pet. and 5% aq.) were ++; a test to Al subacetate (1% aq.) was negative. No relevance was found.

In the first published case of sensitization to Al from hyposensitization with Al-hydroxide-precipitated grass pollen (7), patch tests were positive to Al powder, Al sulfide (2% aq.), Al chloride (2% aq.) and Al subacetate (1% aq.). A 10-year-old boy, when inoculated for the 3rd time with an Al hydroxide precipitated vaccine, experienced a violent but transient local reaction (1). 9 years later, Al hydroxide (1% aq.) and vaccine patch tests were strongly positive, whereas Finn Chambers® caused no reaction. Veien et al. (2) between 1982 and 1986 observed 13 children reacting to Al chloride 2% aq. on patch testing: 9 had excoriated pruriginous papules at injection sites of hyposensitization; 4 reacted where they had been vaccinated in infancy; controls were negative.

As clearly confirmed by our 2 cases, Al allergy, though rare, is not exceptionally so, even in adults. It is in vaccines and pollen or dust extracts for hyposensitization that Al becomes most sensitizing, followed less significantly by antiperspirants and other topical preparations. We should be keenly aware of the sensitizing potential of vaccines and hyposensitizing extracts, specifically in patients with persistent pruritic nodules at injection sites. In France, numerous vaccines are absorbed on Al hydroxide (D.T. Coq.®, Tetragrip.®, D.T. vax®, Tetravax.®, Hevac B®), but the Institut Pasteur has replaced Al hydroxide by calcium phosphate.

Several cases of zinc sensitization have also been reported (11) after zinc-precipitated insulin injections.

Finn Chambers[®], not suitable for all mercury salts, can cause allergic reactions to Al. When faced with ring-like reactions, one may sometimes wonder whether they are irritant or allergic, but in both our cases, the morphology of reactions was definitely allergic (vesicular). One should not confuse "excited skin syndrome" with Al allergy. Should there be any doubt, patch tests must be carried out again with materials free from Al.

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