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Vaccination granulomas and aluminium allergy: course and prognostic factors

KNUD KAABER[1], AKSEL OTKJÆR NIELSEN[1] AND NIELS K. VEIEN[2]

[1]The Dermatology Clinic, Bredgade 30, DK-7400 Herning, Denmark
[2]The Dermatology Clinic, Vesterbro 99, DK-9000 Aalborg, Denmark

21 children who had cutaneous granulomas following immunization with a vaccine containing aluminium hydroxide, and who had positive patch tests to aqueous aluminium chloride and/or to a Finn Chamber, were followed for 1 to 8 years. During the period of observation, the symptoms cleared in 5 children, improved in 11, and remained unchanged in 5. The course of the granulomas could not be correlated with sex or atopy, nor with intensity of the initial aluminium patch test. 4 children were patch tested again with aluminium.

Key words: childhood immunizations; follow-up; cutaneous granuloma; aluminium; repeat patch testing.

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Clemmensen & Knudsen (1) described a patient, with cutaneous granuloma following hyposensitization therapy, who had a positive patch test to aluminium chloride. Subsequent studies have reported similar findings (2–4). Identical clinical symptoms have been described in children immunized with vaccines containing aluminium hydroxide (3–6). These patients with positive patch tests to aluminium or aluminium salts typically develop pruritic subcutaneous nodules with overlying lichenification, excoriations and occasional hypertrichosis at the site of the vaccination. The course is often protracted.

We have followed up a group of children who developed granulomas following immunizations and who had a positive patch test to aluminium.

Patients and Methods

23 children who had had granulomas for more than 1 year participated in the study. All the children had been immunized with Di-Te-Pol® vaccine (Statens Seruminstitut, Copenhagen, Denmark), which contains aluminium hydroxide, and all had positive patch tests to aluminium chloride 2% aq. and/or to an aluminium Finn Chamber®.

At a follow-up examination, clinical symptoms and the possible persistence of granulomas were noted, and details recorded of personal and family histories of atopy.

4 patients were patch tested again for various reasons, but no systematic repeat patch testing was carried out for ethical reasons.

The patients were divided into 3 groups on the basis of the clinical findings:

Group 1: patients whose granulomas had healed, without recurrence of symptoms, for 6 months or longer;

Group 2: patients who showed improvement, with a decrease in frequency and/or intensity of symptoms;

Group 3: patients whose symptoms remained unchanged, having approximately

the same intensity as at the initial examination.

The group that had healed was compared with the other 2 groups with regard to sex, personal and family history of atopy, and patch test response to aluminium. Statistical evaluation was carried out using the Fisher exact test and the Student *t*-test.

Results

21 of the 23 children, 12 girls and 9 boys aged 4 to 15 years (mean 7.6 years), were available for follow-up examinations. 2 patients could not be traced.

The symptoms of 5 patients had cleared at the time of follow-up, 11 showed improvement, and 5 remained unchanged. The results of the follow-up are presented in Table 1.

3 of the 5 patients whose symptoms had cleared were boys, compared with 6 of the 16 who showed improvement or whose symptoms remained unchanged. 1 of the 5 who had cleared was an atopic, compared with 2 of the 16 who had improved or remained unchanged. In 3 of the 5 who had healed, there was a family history of atopy, as compared with 3 of 15 who had improved or remained unchanged. None of these differences is statistically significant (the Fisher exact test).

The mean patch test score, with patch test reactions graded 1 for +, 2 for ++ and 3 for +++, was 2.4 for patients who had cleared, compared with 2.25 for those who had improved or remained unchanged ($p > 0.05$, Student *t*-test).

3 of the 4 children who were patch tested again at follow-up no longer had granulomas or related symptoms. 2 of the 3 patients who had healed had lost their aluminium allergy. 1 patient with unchanged symptoms and 1 who had healed still had positive patch tests to aluminium.

Table 1. Clinical findings at time of follow-up

Observation time	Healed	Improved	Unchanged
> 1 year < 2 years	1	1	0
⩾2 years < 4 years	2	4	3
⩾4 years < 6 years	1	5	1
⩾6 years	1	1	1
total	5	11	5

Discussion

Sensitization to aluminium is rare and is peculiar in that, in nearly all published cases, sensitization has been caused by repeated injections of substances containing aluminium given over a prolonged period in the course of hyposensitization therapy.

The granulomas in our patients were caused by 3 successive injections of Di-Te-Pol®, a vaccine containing aluminium hydroxide, which were given during the first 15 months of life. At the time of diagnosis, the youngest child was 15 months old.

This condition is rarely seen in adults (6, 7), which may indicate that granulomas caused by sensitization to aluminium disappear before adulthood. In our study, all symptoms and signs disappeared in 24% of the patients within 6 years of sensitization.

The loss of aluminium sensitivity among those patients who had healed could be because, as granulomas disperse, aluminium disappears from the skin, thus diminishing the antigenic load.

X-ray diffraction analysis has shown the presence of aluminium in biopsies of granulomas which have persisted for several years (2).

Aluminium allergy was seen to persist in 1 adult patient after granulomas had dispersed (5). The authors thought that this persistence might have been due to exposure to aluminium in deodorants. The patients in our study were too young for this to be the explanation.

In summary, an unusual hapten, introduced in an unusual way on just 3 occasions during the first 15 months of life, can provoke a peculiar and persistent form of allergic contact dermatitis.

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Address:

Knud Kaaber
The Dermatology Clinic
Bredgade 30
DK-7400 Herning
Denmark