

Vaccine-induced aluminium allergy and long-lasting subcutaneous itching nodules

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentlig försvaras i hörsal Arvid Carlsson, Academicum, Medicinaregatan 3, Göteborg, torsdagen den 2 december 2021 kl. 09.00

av Anette Gente Lidholm

Fakultetsopponent:

Cecilia Svedman, Professor

Lunds universitet, Sverige

Avhandlingen baseras på följande delarbeten

- I. Gente Lidholm A, Bergfors E, Inerot A, Blomgren U, Gillstedt M, Trollfors B. Unexpected loss of contact allergy to aluminium induced by vaccine. Contact dermatitis. 2013;68(5):286-92. doi: 10.1111/cod.12053
- II. Gente Lidholm A, Inerot A, Gillstedt M, Bergfors E, Trollfors B. Comparison of reactivity to a metallic disc and 2% aluminium salt in 366 children, and reproducibility over time for 241 young adults with childhood vaccine-related aluminium contact allergy. Contact Dermatitis 2018; Jul;79(1):26-30. doi: 10.1111/cod.12977
- III. Gente Lidholm A, Inerot A, Gillstedt M, Bergfors E, Trollfors B. Long-term clinical course and prognosis of vaccine-related persistent itching nodules. Manuscript submitted for publication.
- IV. Gente Lidholm A, Inerot A, Gillstedt M, Bergfors E, Trollfors B. Long-term prognosis of vaccine-induced contact allergy to aluminium - third patch-test and different test preparations. In manuscript.

**SAHLGRENKA AKADEMIN
INSTITUTIONEN FÖR KLINISKA VETENSKAPER**



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Abstract

Background: Aluminium contact dermatitis is rare even though aluminium is frequently used in antiperspirants and sunscreens. Sensitisation to aluminium is mostly a side effect of aluminium-adsorbed vaccines. These can also induce long-lasting intensely itching subcutaneous nodules (granulomas) at the injection site.

During clinical trials on an acellular aluminium-adsorbed pertussis vaccine in the 1990s in Gothenburg, Sweden, persistent itching nodules were –unexpectedly– reported in 745 of ~ 76 000 vaccinated. Contact dermatitis to aluminium was verified by patch test in 377 children with itching nodules.

Aim: This thesis aims to study the long-term clinical prognosis of itching subcutaneous nodules and aluminium allergy in children who received an aluminium-adsorbed pertussis vaccine in a clinical trial.

Patients and Methods: All 745 vaccinated children with itching nodules in the pertussis vaccine trial were enrolled in a long-term follow-up study (>20 years).

Results: The median duration of itching was 6.6 years. During the follow-up time 637/745 (86%) of the participants experienced full symptom recovery. The remaining were markedly improved. In 186 of 241 (77%) who were tested twice aluminium hypersensitisation was no longer detectable. A negative patch test was significantly correlated with loss of itching. 3-7% of the participants who received other aluminium-adsorbed vaccines later in life reported mild and transient itching at the new injection site. The optimal compound to establish aluminium hypersensitivity could not be determined.

Conclusion and recommendations: Vaccine-induced subcutaneous itching nodules associated with aluminium allergy in infants and children can cause great suffering and have a protracted course. However, long-term prospective studies show that both clinical symptoms and delayed hypersensitivity for aluminium disappear over time. Further vaccination with aluminium-adsorbed vaccines is safe in older children given that the original nodule has vanished and the itching will have resolved or nearly resolved.

Keywords: Childhood vaccine, adverse event, aluminium, aluminium allergy, itching nodules, subcutaneous granulomas, patch test, tolerance