



# Allergologia et immunopathologia

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## RESEARCH LETTERS

### Repeated episodes of anaphylaxis after the first consumption of egg

To the Editor:

The egg is a major cause of food allergy in childhood, its prevalence varies taking into account the selection criteria, with an estimated prevalence of self-reported reactions as high as 7% but it has been confirmed with oral challenge in only 1.7%.<sup>1</sup> However anaphylactic reactions to egg are not commonly reported and are even less common after first consumption.

In this report we describe an unusual case of egg allergy in an eight-year-old girl who experienced allergic symptoms of erythema, urticaria, angio-oedema and severe bronchial obstruction at 10 months of age a few minutes after the first consumption of small quantities of scrambled egg, and required emergency care.

At the age of 12 months she began to regularly eat cake, cookies, bread and other egg-containing products without problems but she did not receive the MMR vaccine (measles, mumps and rubella) due to the fear of a new reaction. Six months after the first episode, the parents again gave egg to the girl with the recurrence of anaphylactic symptoms a few minutes later. At the age of six years the patient ate one bite of scrambled egg again and five minutes later she had a new anaphylactic episode.

The father of the patient sometimes applied scrambled egg to the child between the ages of two and six years on the cheek causing erythema, itching and wheals. However, she received 0.5 ml of the influenza vaccine at the age of seven years without complications. She received the vaccine schedule recommended by World Health Organisation (WHO) in developing countries for the first five years without complications except for MMR because of the parents' fear. She never received the vaccine for yellow fever.

The patient had a serum total IgE level of 1546 UI/ml, a skin prick test (SPT) for aeroallergens positive for Blo t, Der f, dog epithelia, *Alternaria alternata*, cockroach group (*Blattella periplaneta* and *blata*) and mosquito. An SPT for food allergens showed sensitisation for whole egg (5 mm); egg white (6 mm); egg yolk (5 mm); Gal d 1 (4 mm); and Gal d 2 (5 mm). The SPTs were with commercial extracts from leti®. We did Prick by prick test and confirmed the results obtained with the commercial extracts for egg white (8 mm, 7 mm, 6 mm) and egg yolk (4 mm, 3 mm, 3 mm). The prick by prick tests were performed in triplicate because it is not

with a standardised extract. We used histamine and saline solution as positive and negative controls with a result of 5 mm and 0 mm respectively, a wheal diameter of at least 3 mm was positive. Specific IgE measurement performed by RAST technique for egg white was negative (0.29 kU<sub>A</sub>/l) the same as for egg yolk (0.30 kU<sub>A</sub>/l). We could not study the sensitisation of the patient to specific egg allergens, Gal d 3 and Gal d 4.

It was decided to perform an oral provocation test open controlled administering 50 grams of boiled whole egg divided in four doses; In the first dose 5gr (10%) was administered, then 10gr (20%), then 15 gr (30%) and finally 20 gr (40%). Before the oral provocation test we again performed a prick by prick test with egg white (8 mm, 7 mm, 6 mm) and egg yolk (7 mm, 6 mm, 3 mm). The oral challenge was negative. To complete the study we did an atopy patch test with egg white, egg yolk and egg mixture after the oral provocation. We did not observe skin changes after 72 hours or 96 hours.

Associated diseases included controlled allergic asthma that presented at the age of two years, allergic rhinitis and atopic dermatitis which began at the age of three months and were controlled before the two years. One week after the oral provocation test, she received the MMR vaccine without complication. At the time of writing, she has experienced no further episodes after three months resuming the consumption of boiled egg.

Egg allergy is common but the presentation of anaphylactic episodes is very unusual. Some studies have shown that sensitisation to egg proteins can occur in the gestational period or through maternal milk.<sup>2,3</sup> This could explain why the patient presented skin and respiratory symptoms after the first egg consumption.

Diagnosis of immediate-type hypersensitivity begins with a thorough clinical history and physical examination. Measurement of IgE and SPT have high sensitivity but low specificity for predicting adverse reactions that can occur in subject after the consumption of egg in their diet or after the oral challenge. Sporik et al. showed that a wheal greater than or equal to 7 mm has a high value in predicting the outcome of a provocation with egg.<sup>4</sup> Searching for a "point of care" with the measurement of specific IgE to egg, Sampson et al. and Ando et al. found in two separate works that children with values above 7 kU<sub>A</sub>/l for Sampson,<sup>5</sup> and 7.4 kU<sub>A</sub>/l for Ando,<sup>6</sup> presented in 95% of the cases with oral challenge clinical reactions. However, this point is still debated because other studies

suggest different cut off values with levels as low as 1.2 kU<sub>A</sub>/l.<sup>7</sup>

IgE levels for egg white and yolk of our patient were low, while the wheals formed with the prick test and prick by prick test were significantly larger. We note that in our patient, SPT and serum Ig E measurement suggested opposite provocation test results.

Egg white is the major source of allergens in egg. Ovomuroid (Gal d 1), ovalbumin (Gal d 2), ovotransferrin/ conalbumin (Gal d 3) and lysozyme (Gal d 4) have been identified as the major allergens. Ovomuroid has been identified to be the most important egg protein clinically, presumably because of its ability to maintain allergenicity despite extensive heating. Lemon-Mule et al. suggest that extensive heating (e.g baked) diminishes the allergenicity of egg white protein and that subjects with egg allergy differ in their ability to mount IgE antibody responses against heated (denatured) egg white proteins<sup>8</sup> It has been hypothesised that the food body, consisting of fats, carbohydrates, and other proteins, may affect allergenic potential of allergens. For example, the fats may protect proteins during the digestion process, or they may influence the activation of immune cells, which may result in enhanced allergenicity of a protein.

Those studies could explain why our patient could not tolerate regular heated scrambled egg but she can eat egg products with a different food matrix and extensive heating, such as cookies. The ingestion of extensive heated egg product in our patient could contribute to the outgrowing of allergy to regular heated egg.

It is considered that the natural evolution of food allergy has good tolerance prognosis but the estimated exact probability of tolerance varies greatly between studies. Savage found that only 12% of children with egg allergy have tolerance at six years age<sup>9</sup> while another study indicates that 66% of children fail to develop tolerance until five years of age.<sup>10</sup> Our patient who ate egg presented with anaphylaxis and required emergency care at the age of six. We perform the oral provocation test and confirmed the tolerance of the patient at the age of eight, contrary to the predictive results of prick test.

We seek to show an unusual and severe case of egg allergy and that despite the great efforts being made to predict tolerance through Ig E levels or skin prick as to whether a patient can eat eggs or not, it is still under discussion when we can be safe. The oral challenge and medical history

remain the gold standard tools for diagnosis and prognosis of patients with egg allergy.

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## Phyto dermatitis caused by *Agave americana*

To the Editor:

*Agave americana* (Figure 1) is a popular ornamental plant. Irritant contact dermatitis induced by *Agave americana* has rarely been reported.

We present a case of allergic contact dermatitis associated with the use of this plant.

A 58 year-old woman developed an acute dermatitis on her face and neck after application of *Agave americana*. Due to confusion she had used this plant as a treatment for rheumatism instead of *Aloe vera*. A few minutes after using this plant she developed an intense pruritus on the contact zone. This area was intensive washed with water and soap. Twelve hours later she developed erythema, pruritus, oedema and suppurative lesions on her face and neck. The symptoms disappeared after treatment with systemic antihistamines and corticosteroids some weeks later.