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ORIGINAL ARTICLES

Results of the oral egg-challenge test performed on two different groups of children. One group with a history, suggestive of allergic reaction with egg intake and the other group sensitised to hen's egg without previous egg intake

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Egg allergy;
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Abstract
Introduction: Egg allergy is an adverse immune-system reaction of an IgE-mediated type, which can happen in children after egg intake and several times after their first egg intake.
Objectives: Compare the results of the oral egg-challenge test in two groups of egg-sensitised children, with and without prior intake.
Patients and methods: Retrospective study of two egg-sensitised groups (72 subjects).
Group 1: 22 children without prior egg-intake.
Group 2: 50 children with a clinical history of adverse reactions after egg intake.
Skin prick tests, egg-white specific IgE (sIgE) and yolk specific IgE, were performed on all children. The oral egg-challenge tests were performed after a period of egg-avoidance diet and when egg-white specific IgE levels were lower than 1.5 KU/L.
Results: 31.8% of the children in Group 1 did not tolerate egg-intake whereas 38% of the children in Group 2 did not tolerate egg-intake. Egg-avoidance periods lasted 19.5 and 18 months, respectively.
Egg-white specific IgE levels went down in both groups after an egg-avoidance diet. No statistically significant differences were found between the groups and the positivity of oral egg-challenge test.
Conclusions: No statistically significant differences were found in the behaviour of the two groups studied.
Given the high risk of adverse reactions, it was recommended that any egg-introduction tests were to be performed in a hospital environment on the children who were sensitised to hen's egg (including children without prior egg intake).

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Introduction

Egg is a foodstuff that often produces allergies in early childhood due to its high protein-content.

Egg allergy is an adverse reaction that has an immunopathogenic mechanism. Egg allergy prevalence is still unknown. It ranges from 0.2% to 7% in the meta-analysis by Rona et al.[1] According to the outcome of the study ''ALERGOLOGICA 2005''[2] carried out by SEAIC, the most frequent allergy-producing foods in children younger than seven years of age in Spain are egg; milk; fish; and nuts. In older children the culprit is vegetables.

Egg-sensitisation in children without prior egg-intake has often been detected in tests for atopic dermatitis (AD) and cow's milk-protein allergy.

Several IgE-mediated reactions [3–6] were described after first intake, which points to a prior sensitisation that can have been produced by different means; either by intrauterine (in utero) sensitisation, due to the fact that egg-specific IgE [7] has been found in cord blood, or by means of breast-feeding.[8] A third means could be objects that have been contaminated with egg particles, such as cooking equipment and toys.

There is every likelihood that children who suffer from egg allergy will have a history of AD.[9–12] This pathology often begins in the second or third month of life when the baby is being breast-fed. That is to say that it happens during lactation, and thus there is no relationship to egg-intake.[5]

Once there is an indication of immediate egg allergy from a patient's preliminary case history, egg sensitisation must be demonstrated. This can be achieved by skin prick tests (SPT) and/or in vitro tests. The SPT is the best means of diagnosing egg allergy owing to its high sensitivity (73–100%), although it has a lower specificity. Egg SPT negativity might rule out egg allergy in most cases due to its highly negative predictive value.(86%–91%).[3,13,14]

Another means to determine egg sensitisation is egg-specific IgE antibodies determination test.(RAST, CAP).

Some studies have attempted to determine cut-off points for specific IgE levels in order to predict clinical reactions and thus avoid oral challenge tests which are highly likely to produce a positive outcome.[9,13,15]

Children who have been diagnosed as suffering from egg allergy are checked regularly so as to determine the moment when tolerance appears. Egg-white specific IgE is determined and afterwards, levels of sensitisation are studied. A positive development to tolerance is shown in the event of lower levels. In a long-term retrospective study, 37% of egg-allergic children showed tolerance at the age of 10 years.[16] In a prospective study, half of the children showed tolerance between the ages of 4 and 4.5 years (18% of the subjects after a period of two years, 52% of the subjects after 48 months and 66% of the subjects after 60 months).[17]

Few studies have been found dealing with the clinical management of egg-sensitised children without prior egg intake. Among them, there is a noteworthy study by Caffarelly et al.[3] according to which, SPTs for egg can be useful to predict which children will have a reaction on their first egg exposure. Boissieu et al.[4] have observed that tolerance develops around the age of three years in egg-sensitised children without prior egg-intake. According to Monti et al.[5] children with AD who have never eaten eggs can display reactions after their first intake. In addition, Dieguez et al.[6] have proven that milk-sensitised children have a higher risk of egg allergy. Early diagnosis is necessary and the SPT is a very useful tool for diagnosing immediate IgE egg reactions on the first known exposure. In this study conducted on children with cow's milk allergy, 62.5% of the subjects without prior egg intake were found to be egg sensitised in SPTs. In addition, the challenges were positive in 56.9% of the children who were egg sensitised without prior egg intake.

Many of the egg sensitised patients can been found early before their egg intake because we routinely check egg sensitisation in children with AD or children with allergy to cow's milk. In our practice the oral egg challenge is conducted when cut-off values of egg white-specific IgE are 1.5 KU/L.

The main objective of this study has been to compare the results of the oral challenge test in two groups of egg-sensitised children with and without prior egg intake after a period of egg avoidance.

Methods

Patients

This is a retrospective study comparing two groups of egg-sensitised children after a period of egg avoidance, who underwent an oral egg challenge test between 01/2007–09/2007(9 months).

72 egg-sensitised children (44 boys, 28 girls) were studied, median age was 2.5 months (13–108).Skin prick tests, egg-white specific IgE, yolk specific IgE were performed in all children.

Serum egg white-specific IgE was tested (every six months) until values under 1.5 KU/L were reached. At this point the oral challenge test was performed.

The patients were separated into two groups:

Group 1: (22 children) Egg had not been introduced into their diet (no evidence of prior egg intake). Egg sensitisation was detected in an atopy test and/or cow's milk allergy test.

Group 2: (50 children) They were studied due to a clinical history of possible allergic reaction after egg intake.

Full features of the sample are set out in Table 1.

Allergological study

Skin prick tests

Antihistamine use was suspended during the 7 days that preceded the test. (antihistamines inhibit SPTs).

Standard food allergens were used (Bial-Aristegui laboratories, Bilbao, Spain) including: cow's milk, alpha-lacto albumin, beta-lacto globulin, casein, whole egg, ovalbumin, ovomucoid, egg white, yolk, wheat, corn, rice, gluten, fish, chicken, veal, almond, soy and sweet potato. Pneumoallergens included *dermatophagoides pteronyssimus*, phleum, and cat epithelium (given its widespread existence in our environment). Histamine (10 mg/dl) and glycerol saline served as positive and negative controls, respectively.