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Letter to editor

Oral food challenge in children affected by egg allergy: why complicate pediatric allergist's life?

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To the editor,

The oral food challenge (OFC) represents the gold standard for assessing egg allergy in children. (1) At the same time, it is also important to assess the tolerance to the egg. (1) 60-75% of children diagnosed with an egg allergy develop tolerance before adolescence.[1] OFC is usually carried out by giving the patient fresh raw egg (FRE), (1) but this administration could cause multiple issues. First, the low palatability can lead to refusal by the patient. Moreover, FRE can cause serious infections contaminated by bacteria (Salmonella Enteritidis) or viruses (Avian flu). (2) Egg contamination with Salmonella can happen during or before the bacterium's egg deposition. (2) During egg laying, infected material from the hen (especially feces) may penetrate the shell, contaminating the egg. (3) A safer and easily practicable alternative to using FRE for OFC can potentially involve pasteurized raw egg white (PREW). Pasteurization is a strictly regulated and finely controlled industrial process that involves heat and pH control to ensure the product's sterility. In the case of eggs, the temperature is raised to 57° C for 180 s, thus ensuring the inactivation of Salmonella (3) and Influenza virus – A. (4) Despite treatment at high temperatures, the pasteurization process does not alter the allergenic characteristics of the product. The two proteins responsible for the allergic reactions (ovomucoid and ovalbumin) are partially thermostable, and it is demonstrated that they withstand 20 minutes of boiling before losing their characteristics. (5) In addition, using PREW can allow for easier administration than raw egg. It can be administered alone or mixed with another food, such as juice, fruit or dessert. We performed a retrospective, observational study to evaluate the efficacy of OFC with an alternative form of raw egg, such as the PREW, to assess the tolerance to the egg in children affected by an egg allergy. It involved all children with a known diagnosis of IgE-mediated egg allergy and an exclusion diet for eggs who attended our pediatric allergy unit in Mantua, Italy, between 1 January 2021 and 31 March 2022. They underwent an oral food challenge (OFC) using PREW to assess their potential egg tolerance. About OFC, it was performed by offering the child 36 milliliters of PREW in progressively increasing quantities. Exclusion criteria represented a home reintroduction of the egg before OFC, abnormalities in the medical evaluation and ongoing antihistamine therapy. Informed consent to use anamnestic information was given by the parents of children. STATA software (version 16) for Windows was used for statistical evaluation; specifically, Fisher's exact test was applied to study the correlation between anamnesis, diagnostic tests, and OFC. Nine children (4 boys, 5 girls) with IgE-mediated egg allergy were selected, and 9 OFC were performed (Table 1). Seven patients (77.7%) passed OFC to PREW. Two patients (22.3%) failed OFC. Moreover, all patients who passed OFC could tolerate eggs at home within the next two months. No statistically significant association

Table 1. Characteristics of the patients.

Characteristics	**n (%)**
Age at OFC (median, range), months	96 (48-160)
Gender	4 M, 5 F
% of patients suffering from co-existing atopic disease	6 (66,6%)
Patients with negative egg white-SPT	0
Patients with positive egg white-SPT	9
Patients with egg white - IgE > 0,10 kU/L*	7
Patients with egg white – IgE < 0,10 kU/L	1
Patients with negative OFC to pasteurized raw egg white	7 (77,7 %)
Patients with positive OFC to pasteurized raw egg white	2 (22,2%)
% of patients who passed OFC were able to tolerate eggs at home within the next two months	7/7 (100%)

has been found between egg-SPT and the outcome of OFC (p=1,000) or between white egg-sIgE and OFC (p=1,000). Although the low sample size, this retrospective study demonstrates that OFC to PREW could represent a valid tool to assess the tolerance to the egg in children affected by IgE-mediated egg allergy. Specifically, all children with a negative OFC to PREW were indeed tolerant of the egg when it was reintroduced into their diet at home. After two months, the children's parents were contacted by telephone and confirmed that none had allergic symptoms after egg exposition. This suggests that OFC to PREW has a potential negative predictive value of 100%. This result agrees with a cross-sectional study by Jurado et al., (5) who evaluated the tolerance of PREW vs FRE in 21 children affected by an egg allergy. Specifically, the protein profile and IgE-binding capacity of children tested with PREW and FRE behaved similarly. As in our study, SPT and sIgE do not always correlate with the outcome of OFC in the tolerance assessment. This result agrees with the findings of Shek et al., (6) who demonstrated that neither SPT nor the absolute value of sIgE represents an isolate prognostic factor to assess negative OFC. This study has some limitations. First, the low sample size is due to the reduced incidence of this disease. Second, data were collected in a single pediatric allergy unit. Third, the parents of children self-reported the anamnestic information about the exclusion diet before OFC so that some patients could be lost or misclassified. The result of this study supports the use of PREW in the OFC to assess tolerance in children affected by egg allergy. It can represent a valid alternative to using FRE, currently used in clinical practice. Indeed, this new method seems to guarantee the same results regarding allergenicity. On the other hand, it is characterized by a lower infectious risk and shows an easier mode of administration. It does not have the viscous consistency that characterizes FRE and can be easily mixed with other foods (e.g., desserts) to increase palatability.

Conflicts of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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