Predicting Outcomes of Oral Food Challenges by Using the Allergen-Specific IgE-Total IgE Ratio


PURPOSE OF THE STUDY. To examine the accuracy of the ratio of serum immunoglobulin (sIgE) to total immunoglobulin E (tIgE; “Ratio”) in predicting the outcome of oral food challenges.

STUDY POPULATION. The study population was derived from an allergy outpatient clinic in Chicago, Illinois, from 2009 to 2013. The study included children aged 11 months to 18 years (median 4.0 years) with history of food allergy to milk, egg, peanut, tree nuts, shellfish, or seeds, who underwent oral food challenges (OFC) to those foods and for whom food-specific (sIgE) and tIgE values were obtained.

METHODS. This was a retrospective chart review. The Ratio was calculated by using the formula Ratio = (sIgE / tIgE) × 100. Multiple logistic regression models were used to assess statistical correlations between the outcome of OFC and the Ratio. Receiver operator characteristic curves were fitted, and the area under the curve was computed to compare the accuracy of the Ratio with sIgE alone in predicting the outcome of OFC.

RESULTS. One hundred sixty-one children underwent 195 challenges: 57% were boys, 76% were allergic to multiple foods, and 86% had atopic comorbidities. Overall, the Ratio for children who failed the OFC was higher than the Ratio for those who passed (failed 1.48% vs passed 0.49% n = 195). Area under receiver operator characteristic curves showed that the Ratio was more accurate in predicting OFC outcome (Ratio 0.69 vs sIgE alone 0.55; P = .03). However for less persistent food allergens (milk, egg, wheat, and soy), there was no significant difference in the median ratio for participants who failed their challenge than those who passed. In contrast, for challenges to more persistent food allergens (peanut, tree nut, seeds, and shellfish), the median Ratio for participants who failed their challenge was 2.18%, which was significantly higher than the 0.41% Ratio for those who passed their challenge (n = 93) (Ratio 0.81 vs sIgE alone 0.54; P < .01). The trend was independently observed for peanut and tree nut challenges though these were not statistically significant.

CONCLUSIONS. These findings suggest that using the Ratio may be more accurate than sIgE alone in predicting outcomes of OFC performed to confirm the development of tolerance to select food allergens, especially peanut and tree nuts.

REVIEWER COMMENTS. The findings suggest that the Ratio may be a valuable added tool in the diagnosis of food allergy. Why would this be? Perhaps if there is more competition on the surface of the mast cell or basophil from “other” IgE antibodies, cross linking of sIgE for the food in question is less likely to activate the cells. However, the findings were only significant for more persistent food allergens. Why the study noted different influences of the Ratio for different foods remains to be determined but could represent a number of factors, including age of the children and atopic comorbidities at the time of OFC. The study offers an interesting insight, but the utility of a “fudge factor” in interpreting sIgE at different levels of tIgE needs additional study and validation.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2015–277600

Edith Schussler, MD
Scott H. Sicherer, MD
New York, NY

Food Allergen Panel Testing Often Results in Misdiagnosis of Food Allergy


PURPOSE OF THE STUDY. To determine the utility of food allergy panel testing among patients referred to a pediatric food allergy center.

STUDY POPULATION. New patients seen between September 2011 and December 2012 by 1 provider in a tertiary referral pediatric food allergy center at Southwestern Medical Center in Dallas, Texas.

METHODS. This was a retrospective chart review. An analysis was performed to calculate the estimated cost of evaluation for patients who have received a food allergy panel.

RESULTS. Of 797 new patient encounters, 284 (35%) patients had received a food allergy panel. Only 90 (32.8%) patients had a history warranting evaluation for food allergy; 126 were avoiding a food on the basis of recommendations from the referring provider, and 112 (88.9%) were able to reintroduce at least 1 food into their diet. The positive predictive value of food allergy panel testing in this unselected population was 2.2%. The estimated cost of evaluation for this population was $79 412.

CONCLUSIONS. Food allergy panel testing often results in misdiagnosis of food allergy, overly restrictive dietary avoidance, and an unnecessary economic burden on the health system.

REVIEWER COMMENTS. This clinical concept cannot be stressed enough! It is an important issue that comes up time and time again and needs to be appropriately understood. The results showed that panels of food-specific immunoglobulin (Ig)E testing have little utility as a screening tool. Misdiagnosis of food allergy is partially due to the low positive predictive values of IgE tests. Another reason for the misdiagnosis of IgE-mediated food allergy from these tests is a lack of understanding about what is a true food allergy, a specific immune response that occurs
Predicting Outcomes of Oral Food Challenges by Using the Allergen-Specific IgE-Total IgE Ratio
Edith Schussler and Scott H. Sicherer
*Pediatrics* 2015;136;S244
DOI: 10.1542/peds.2015-2776OO

Updated Information & Services
including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/136/Supplement_3/S244.1

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
http://www.aappublications.org/site/misc/Permissions.xhtml

Reprints
Information about ordering reprints can be found online:
http://www.aappublications.org/site/misc/reprints.xhtml
Predicting Outcomes of Oral Food Challenges by Using the Allergen-Specific IgE-Total IgE Ratio
Edith Schussler and Scott H. Sicherer
*Pediatrics* 2015;136;S244
DOI: 10.1542/peds.2015-277600

The online version of this article, along with updated information and services, is located on the World Wide Web at: http://pediatrics.aappublications.org/content/136/Supplement_3/S244.1