

Correspondence

Allergy testing in predicting outcome of open food challenge to peanut

To the Editor:

We read with interest the report by van Erp et al¹ showing that in 81 Swedish children with suspected peanut allergy, 0.1 and 5.0 kU_A/L Ara h2 cutoff values correctly predicted the outcome in 62% of children undergoing peanut double-blind placebo-controlled food challenge, and with the addition of basophil activation test Ara h 2 and 6 80% were correctly predicted. They proposed a flowchart for the diagnosis of peanut allergy. Clinicians managing peanut and other food allergies need diagnostic tools that are accurate, but also simple and readily available. Complex algorithms involving artificial specific IgE cutoffs and labor-intensive basophil activation test assays with restricted availability are not a practical option.

We retrospectively surveyed the value of peanut skin prick, peanut IgE, and component allergy tests (Ara h 1, 2, 3, 8, 9) in predicting the outcome of 130 open peanut oral food challenges (OFCs) in children aged 1 to 18 years (median, 7 years) attending our specialist pediatric allergy center between 2012 and 2016. OFC was performed in children who had not reacted to peanuts since early childhood, where there was no history of direct ingestion of peanuts, or when the family members were too anxious to try the food. Written consent and approval was obtained from all patients. IgE concentrations were measured by automated Immuno-CAP250 processor (Thermo Fischer Scientific, Loughborough, United Kingdom). Sensitization was defined as peanut, or peanut component IgE level of 0.4 kU_A/L or more, or a skin prick test (SPT) wheal size of 3 mm or more. Oral challenge with peanut butter (in children <6 years old) or shelled peanuts was performed using a standardized open-challenge protocol, increasing the amount of peanut every 15 minutes (25 mg, 100 mg, 200 mg, 1 g, 5 g, 20 g). A positive challenge was defined as objective signs of allergy (urticaria, angioedema, vomiting, wheeze). Eighty-eight (68%) passed their OFC. Twenty-four percent failed at 25 mg, 34% at stages 100 to 1000 mg, and 42% reacted to 5 g or more of peanuts. Only 1 patient suffered anaphylaxis (wheeze), requiring intramuscular epinephrine. Ara h 2 above our laboratory's threshold of 0.4 kU_A/L or more correctly identified 95% of children, with a positive predictive value of 94% and a negative predictive value of 97%. This was significantly higher than SPTs' wheal size of 3 mm or more (positive, 75%; negative, 76%) and peanut allergen specific IgE level of 0.4 kU_A/L or more (positive, 81%; negative, 84%) (Fig 1). A 2-year-old and a 5-year-old child had a negative Ara h 2 but failed the OFC, both reacting (vomiting and urticaria) after consuming 5 g or more of peanut.

Although the diagnostic accuracy of OFC surrogates is likely to vary by region, and, for instance, in Mediterranean areas, Ara h 2 may have a lower predictive value,² our study demonstrates that in the North West of England an Ara h2 peanut component above baseline (≥ 0.4 kU_A/L) predicts the outcome of peanut OFC significantly better than either peanut SPT or peanut specific IgE. On the basis of our data and that of other studies,³⁻⁶ we

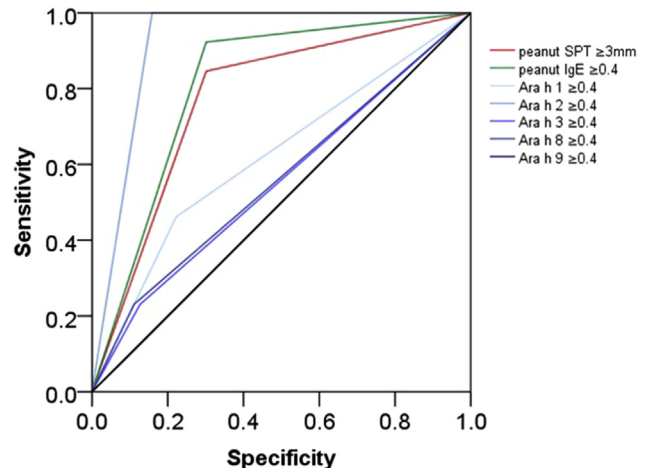


FIG 1. Receiver operating characteristic curve illustrating sensitivity and specificity of peanut SPT, peanut specific IgE, and peanut components in relation to open oral peanut challenge.

suggest that peanut SPT and peanut specific IgE be replaced by Ara h 2 as the routine screening test for peanut allergy.

Shelly Rajput, MB BS^a

Vibha Sharma, MD^b

Stephen M. Hughes, MD, PhD^{a,b}

Carol I. Ewing, MD^b

Peter D. Arkwright, MD, PhD^{a,b}

From ^athe University of Manchester and ^bthe Department of Paediatric Allergy & Immunology, Royal Manchester Children's Hospital, Manchester, United Kingdom. E-mail: peter.arkwright@nhs.net.

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REFERENCES

- van Erp FC, Knol EF, Pontoppidan B, Meijer Y, van der Ent CK, Knulst AC. The IgE and basophil responses to Ara h 2 and Ara h 6 are good predictors of peanut allergy in children. *J Allergy Clin Immunol* 2017;139:358-60.
- Krause S, Reese G, Randow S, Zennaro D, Quarantino D, Palazzo P, et al. Lipid transfer protein (Ara h 9) as a new peanut allergen relevant for a Mediterranean allergic population. *J Allergy Clin Immunol* 2009;124:771-8.e5.
- Klemans RJ, van Os-Medendorp H, Blankestijn M, Bruijnzeel-Koomen CA, Knol EF, Knulst AC. Diagnostic accuracy of specific IgE to components in diagnosing peanut allergy: a systematic review. *Clin Exp Allergy* 2015;45:720-30.
- Nicolaou N, Poorafshar M, Murray C, Simpson A, Winell H, Kerry G, et al. Allergy or tolerance in children sensitized to peanut: prevalence and differentiation using component-resolved diagnostics. *J Allergy Clin Immunol* 2010;125:191-7.
- Kukkonen AK, Pelkonen AS, Mäkinen-Kiljunen S, Voutilainen H, Mäkelä MJ. Ara h 2 and Ara h 6 are the best predictors of severe peanut allergy: a double-blind placebo-controlled study. *Allergy* 2015;70:1239-45.
- Keet CA, Johnson K, Savage JH, Hamilton RG, Wood RA. Evaluation of Ara h2 IgE thresholds in the diagnosis of peanut allergy in a clinical population. *J Allergy Clin Immunol Pract* 2013;1:101-3.

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