

CERTAINTY – assessing allergic reactivity in a subject

VALUE PROPOSITION

The technology relates to a method of assessing allergic reactivity in a subject. In particular, the technology provides a method of predicting the outcome of oral food challenge in a subject. A predictive algorithm (Cork algorithm), composed of 6 clinical factors, has been developed and validated. The model showed a clear advantage in clinical prediction compared to standard methods (96% accuracy versus 61% - 81% respectively). The development of an on-line calculator that will perform the predictive analyses in seconds can be used by health professionals at all levels in clinic and in daily practice. The enhanced choice that this will give parents and patients has implications for the improvement of health related quality of life in families with food allergy and the health economy in cost of performing food challenges. This development also has implications for the improved delivery of food allergy-related health care. For example, cost effectiveness modeling suggests great benefit would accrue from enhanced precision in delineating a stop/continue point during the maintenance phase in Oral Immunotherapy (OIP).

THE TECHNOLOGY

Highly accurate, allergen-specific algorithms were developed separately for each of the three most important food types (peanut, egg, milk), consisting of variables that contributed independently to the accuracy of the final model. The model, composed of 6 clinical factors (SPT (skin prick test), Serum specific IgE (sIgE), total IgE minus (-) sIgE, symptoms, sex, and age), showed a clear advantage in clinical prediction compared to sIgE only, SPT only, sIgE and SPT. Probability values are expressed on a continuous scale and give a quantified probability of likely diagnostic outcome, which is easily understandable for clinician and patient.

sIgE or SPT tests are used clinically to decide if an IgE-mediated food allergy (FA) is likely to be present. These tests are less useful at levels below accepted decision points. A test that could more accurately diagnose IgE mediated food allergy without automatic recourse to food challenge would be of great benefit.

Use of the Cork Algorithm on-line calculator results in a higher predictive accuracy for both patients and physicians.

Table 1: Comparison of four diagnostic methods for peanut, egg and milk combined, including sensitivity, specificity, and accuracy. The Cork Algorithm shows a clear advantage in clinical prediction of allergic status compared to sIgE only, SPT only, sIgE and SPT (96% accuracy versus 61% - 81% respectively).

| Diagnostic method | Sensitivity | Specificity | Accuracy |
|-----------------------|-------------|-------------|------------|
| sIgE only | 75 % | 45% | 61% |
| SPT only | 85% | 65% | 75% |
| sIgE & SPT | 87% | 75% | 81% |
| Cork Algorithm | 97% | 96% | 96% |

DEVELOPMENT OBJECTIVES

- Further development of the on-line calculator
- Potential development of iphone app
- Assess likelihood of allergy to other possible food allergens when presented with multiple (+) tests

FIELDS OF APPLICATION

- Food Allergy Prediction
- Delineating a stop/continue point during the maintenance phase in Oral Immunotherapy
- Prospective application of the algorithm in other pediatric centers in an experimental pre/post design