4819 Hot Topics in Pediatric Allergy and Immunology

Food, Drugs, & Bugs

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Faculty Disclosure Information
SANOFI    Anaphylaxis Advisory Board, Consultant

I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.

FOOD ALLERGY

Allergy Testing: What’s New?
Baked Egg Diet
Natural History of Milk Allergy
Oral Immunotherapy

Diagnostic value of specific IgE to Ara h 2 to predict peanut allergy in children is comparable to a validated and updated diagnostic prediction model

- Centre of Pediatric Allergy in the Wilhelmina Children Hospital in The Netherlands between 2008 and 2010
- 100 patients → 47 allergic, 53 tolerant
- OFCs → 81 DBPCFC, 19 open
- Median age 6 years; 65% males


Allergy Testing: Components

Objectives

Dunn-Galvin model
- 6 predictors:
  - Sex
  - Age
  - History
  - Skin prick test
  - Peanut sIgE
  - Total IgE

Additional predictors
- Allergic rhinitis
- Atopic dermatitis
- sIgE to Ara h 1, 2, 3, 8

Objectives

Dunn-Galvin model

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  – Sex
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Additional predictors

• Atopic dermatitis


A bioinformatics approach to symptomatic peanut allergy

• 62 DBPCFCs: 31 sx, 31 sensitized/tolerant

• Median peanut sIgE 2.2 (range 0.35-15.1)

• Mean age 7.5 years

• Specific IgE & IgG to 419 peptides Ara h 1-3

• Bioinformatic methods applied for data analysis

Lin J, Bruni FM, Fu Z, et al. JACI 2012 May;129:1321-1328

Increasing Accuracy of Peanut Allergy Diagnosis by using Ara h 2

• 5276 one-year-old infants in HealthNuts population-based cohort study

• 200 subjects confirmed by peanut OFC
  – 100 with peanut allergy
  – 100 with peanut tolerance

• Median age 14 months at time of OFC


Ara h 2 sIgE most predictive

• Ara h 2 cutoff point (kU/L)
  → 0.2: 94% sensitivity, 66% specificity
  → 0.5: 55% sensitivity, 98% specificity

The Utility of Peanut Components in the Diagnosis of Peanut Allergy Among Distinct Populations

- 167 subjects in 4 cohorts from US & Sweden
- Median age 11.7 years (IQR 7-15 years)
- Components measured at time of OFC
- PN-IgE most sensitive test (AUC 0.93)
- Ara h2 most specific (0.92) & best PPV (0.94)


Evaluation of Ara h2 IgE thresholds in the diagnosis of peanut allergy in a clinical population (N=60)

Mean age 7 yrs (range 3-19 yrs); PN slgE range 0.4 – 21 kU/L

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Sensitivity, % (95% CI)</th>
<th>Specificity, % (95% CI)</th>
<th>PPV, % (95% CI)</th>
<th>NPV, % (95% CI)</th>
<th>% misclassified</th>
</tr>
</thead>
<tbody>
<tr>
<td>ImmunoCAP Ara h2</td>
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<tr>
<td>0.23 kU/L</td>
<td>92.3 (74.9-99.1)</td>
<td>60 (41.2-76.1)</td>
<td>63.2 (46.8-78.2)</td>
<td>91.3 (72.9-96.9)</td>
<td>26.2</td>
</tr>
<tr>
<td>0.35 kU/L</td>
<td>88.5 (69.9-97.6)</td>
<td>71.4 (53.7-85.4)</td>
<td>69.7 (51.3-84.4)</td>
<td>89.3 (71.8-97.7)</td>
<td>21.3</td>
</tr>
<tr>
<td>2 kU/L</td>
<td>93.6 (9.0-9.6)</td>
<td>94.3 (80.8-99.3)</td>
<td>75 (34.9-96.8)</td>
<td>62.3 (47.9-75.2)</td>
<td>36.1</td>
</tr>
<tr>
<td>ISAC Ara h2</td>
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<tr>
<td>0.3 ISU</td>
<td>80.8 (60.6-93.4)</td>
<td>77.1 (59.9-89.6)</td>
<td>72.4 (52.8-87.3)</td>
<td>84.4 (67.2-94.7)</td>
<td>21.3</td>
</tr>
</tbody>
</table>


Do systemic reactions occur with isolated sensitization to Ara h 8?

- 144 children sens to Ara h 8 (>0.35 kU/L)
  - but not Ara h 1, 2, 3 (<0.35)
- 89.5% (n=129) non-reactive
- 9.7% (n=14) oral symptoms
- 1 OFC with lip swelling, abd cramping (Ara h 6 = 0.45; peanut 1.5 → 8.8 kU/L)

Baked egg diet

Follow-up Baked Egg Study

Criteria for selecting patients for baked egg challenges

Outcomes of 100 consecutive open, baked-egg oral food challenges in the allergy office

- Ingestion of baked egg may accelerate tolerance development to natural/raw egg
- First 100 OFCs with regimented baked-egg recipe in outpatient food allergy clinic retrospectively evaluated


Lieberman JA, Huang FR, Sampson HA, Nowak-Węgrzyn A. JACI 2012 Jun;129:1682-4
The natural history of milk allergy in an observational cohort
Wood RA, Sicherer SH, Vickery BP et al. JACI published online 02 January 2013

- CoFAR observational study of 244 children (3-15 months) followed prospectively with
  (1) convincing history of milk allergy with +SPT and/or
  (2) moderate-to-severe AD and +SPT to milk (n=24)
- Milk allergy resolved in 53% by median 5.25 years

Web-based milk-allergy resolution calculator at cofargroup.org
May assist in counseling families as to prognosis of young (<15 mo) child's milk allergy
Wood RA, Sicherer SH, Vickery BP et al. JACI 2013
Oral Immunotherapy

Oral Immunotherapy for Treatment of Egg Allergy in Children
A. Wesley Burks, M.D., Stacie M. Jones, M.D., Robert A. Wood, M.D.,
David M. Herscher, M.D., Scott H. Scherer, M.D., Robert W. Lindsley, M.D.,
Donald Stabler, Ph.D., Alice K. Henning, M.S., Brian P. Vickery, M.D.,
Andrew H. Liu, M.D., Amy M. Souvlaki, M.D., Wayne G. Sheffrin, M.D., Ph.D.,
Marshall Plaut, M.D., and Hugh A. Sampson, M.D.,
for the Consortium of Food Allergy Research (CoFAR).

- DBPC RCT of 55 children (5-11 yrs) with egg allergy who received oral immunotherapy for up to 22 months (median age of 7 years)

Conclusion: OIT is a highly promising therapeutic intervention
- Egg OIT provided protection by raising the reaction threshold in majority and enabled ~25% to eat egg
- Reactions mostly mild (grade 1)
- ~15% unable to complete therapy, mostly due to allergic reactions
- Mechanisms of OIT unknown
- Relationship to immune tolerance unknown

Milk OIT Cochrane Review
- up-to-date as of October 1, 2012
- 16 records included, representing 5 trials
- 196 patients studied (106 MOIT, 90 controls)
- No uniform protocol
- 62% in the MOIT group could tolerate full serving of milk (~200 mL) compared to 8% control (RR 6.61, 95% CI 3.51 to 12.44)
- None assessed patients off immunotherapy
- For every 11 patients, 1 required IM epi

Outcome: Full desensitization

Subgroup analysis of 4+ years

Cochrane Review of Peanut OIT

"In view of the risk of adverse events and the lack of evidence of long-term benefits, peanut OIT cannot currently be recommended as a treatment for the management of patients with IgE-mediated peanut allergy. Larger RCTs are needed…"

Safety of influenza vaccine for egg-allergic patients
Des Roches A, Paradis L, Gagnon R et al. JACI 2012 Nov;130:1213-1216

- Summary of 4172 patients
  - 513 with severe allergy
- 4729 doses administered
- None developed anaphylaxis
- Risk of anaphylaxis (95% CI): 0-0.08%
  - For severe egg allergy, 0-0.66%

Minimal Risk for TIV: trivalent influenza vaccine
- There is robust evidence that egg-allergic patients, *even those with severe allergy*, can be safely vaccinated in single dose
- PCP administers to persons with only hive reactions to egg with 30-minute observation
- Allergist administers to persons with history of mod – severe reactions from egg ingestion with 30-minute observation
  Exception: previous reaction to vaccine

Risk factors for severe Hymenoptera venom anaphylaxis
- Single-center, observational cohort
- 657 consecutive patients eligible for VIT
  - mean age 44 years (range 6-84 years)
- 26.2% incidence of severe anaphylaxis
- 4 significant risk factors of severe anaphylaxis identified (*P* < .001)

Stoevesandt J, Hain J, Kerstan A, Trautmann A. JACI 2012 Sep;130:698-704
Absent urticaria/angioedema may indicate mastocytosis (baseline serum tryptase)

Cardiovascular medication might be overestimated risk factor in venom-allergic patients

> 11.4 μg/L

Elevated BST

Absence of cutaneous signs

Latency < 5 min.

Age

> 65 years

Cicely insect

Grade

Head or neck swelling

Cardiovascular disease

ACE inhibitor

Beta-blocker & ACE inhibitor

Audacia COPO

Thank You

Educational Materials for Food Allergy
Sicherer SH, Vargas PA, Groetch ME, et al.
J Pediatr 2012 Apr;160:651-6

Materials available online at no cost at www.cofargroup.org