22\textsuperscript{nd} World Allergy Congress

Update on Food Allergy
And Anaphylaxis

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Update on Food Allergy and Anaphylaxis

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Faculty Disclosures

• FINANCIAL INTERESTS
I have disclosed below information about all organizations and commercial interests, other than my employer, from which I or an individual in my immediate family or household receive remuneration in any amount (including consulting fees, grants, honoraria, investments, etc.) or invest money which may create or be perceived as a conflict of interest.

Name of Organization | Nature of Relationship
Allertein Therapeutics, LLC | Consultant, Minority Stockholder
University of Nebraska | Advisory Board
Food Allergy Initiative | Consultant
Immuan T | Advisory Board

• RESEARCH INTERESTS
I have disclosed below information about all organizations which support research projects for which I or a member of my immediate family or household serve as an investigator.

Name of Organization | Nature of Relationship
National Institutes of Health | Grantee
Food Allergy Initiative | Grantee

• Patents – EMP-123 (recombinant protein vaccine) & FAHF-2 (herbal product)

Prevalence of Food Allergy by Age in the United States

Affects 10 – 12 million Americans
CDC Brief on Food Allergy in US

- 3 million or ~4% of children <18 yrs have food allergy
- 18% increase between 1997 and 2007

Increasing Prevalence of Peanut Allergy in the United States

Cutaneous Allergies
Role of Food Hypersensitivity in Atopic Dermatitis
Double-blind Placebo-controlled Food Challenge

Positive Food Challenge
Skin and upper respiratory tract

Atopic Dermatitis
Skin: pruritic, erythematous morbilliform rash

With permission
Prevalence of Food Allergy in Atopic Dermatitis

- 63 patients recruited from Pediatric Dermatology Clinic - M:F = 35:28
- Scored with SCORAD by Dermatologist - patients with moderate - severe AD enrolled (median: SCORAD = 41)
- Screened for specific IgE levels to 6 foods - specific IgE > 0.7 kU/ml = positive
- 41 pts [65%] with evidence of food-specific IgE
  - egg: 28
  - milk: 26
  - peanut: 27
  - wheat: 20
  - soy: 24
  - fish: 4

Prevalence of Food Allergy in Atopic Dermatitis

- Patients with positive food-specific IgE evaluated by history, physical exam, & prick skin tests
- Patients with suggestive results undergo DBPCFC to suspected foods unless history of anaphylaxis
- 31/41 pts with positive evidence of serum IgE to food completed study;
  - 23/31 had evidence of food allergy
- 37% (23/63) of AD patients referred to a University Dermatology Clinic have food allergy

Gastrointestinal Allergies

<table>
<thead>
<tr>
<th>IgE-Mediated</th>
<th>Non-IgE-Mediated</th>
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<tbody>
<tr>
<td>Oral Allergy</td>
<td>EoE</td>
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<tr>
<td>Acute GI Hypersensitivity</td>
<td>AEG</td>
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<tr>
<td>Enterocolitis</td>
<td>Enteropathcy</td>
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<tr>
<td></td>
<td>- Celiac Disease</td>
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<td>Proctocolitis</td>
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Oral Allergy Syndrome

- Associated with pollen-induced allergic rhinitis
- Itchiness in the mouth, mild edema of lips & tongue, and throat "tightness"
- USUALLY no symptoms beyond mouth & throat
- Due to "conserved homologous proteins" - cooking destroys protein

<table>
<thead>
<tr>
<th>POLLEN</th>
<th>APPLE PROTEIN</th>
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<tbody>
<tr>
<td>Birch</td>
<td>Mal d1</td>
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<tr>
<td>Hazelnut</td>
<td>Apple protein</td>
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<td>Almond</td>
<td>Plum</td>
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<td>Peanut</td>
<td>Cherry</td>
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<td>Soybean</td>
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<td>Watermelon</td>
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<td>Melons</td>
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<td>Banana</td>
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Allergic Eosinophilic Esophagitis

- Onset - infancy to adulthood
- Symptoms - reflux esophagitis, vomiting, food refusal, abdominal pain, irritability sleep disturbance & FTT
  - Adolescents: chest pain, dysphagia, globus & impaction
- Foods implicated - milk, wheat, soy, egg, beef, corn
- Diagnosis - failure to respond to PPIs
  - endoscopy and biopsy of esophagus
  - response to protein elimination &/or steroids
- Often involves reactivity to multiple foods
- Increasing prevalence - ? iatrogenic

Allergic Eosinophilic Esophagitis

Endoscopic findings

- Normal
  - 30 – 40% of EoE patients appear normal
- Furrows
  - ~ 40% of EoE patients
Food Protein-Induced Enterocolitis Syndrome

- Onset - generally in first 3 months to 1 year of life
- Symptoms - recurrent projectile vomiting, diarrhea, abdominal distention, & FTT
  - Infants may present with dehydration &/or “septic-like” picture
- Implicated proteins - cow milk & soy; rice, cereal grains, meat & poultry
- Diagnosis - food challenge [0.3 - 0.6 g protein]
  - vomiting - 2 - 4 hrs; ~15% hypotension
  - diarrhea - 5 - 10 hrs
**Respiratory Allergies**

- IgE-Mediated
- Non-IgE-Mediated

- Allergic Rhinitis
- Asthma
- Heiner’s Syndrome
- Laryngeal edema
- Anaphylaxis

**Food Allergy and Anaphylaxis**

- **Anaphylaxis**
  - Olmstead County, MN, experience
  - ~30 cases/100,000 from early '90s to early 2000
  - ~1/3 of cases due to food allergy
  - Extraplated U.S. experience [Population - 305 Million]:
  - ~32,000 cases / year → 53,700 cases / year

- FDA NEISS [34 EDs; 2 mo period]: ED visits / year in US
  - food allergy: ~125,000 (or ~1 ED visit every 3 minutes)
  - anaphylaxis: ~14,000 hospitalizations: ~3,100

**Diagnosing Food Allergy**

Food Allergy Guidelines: *JACI* 2010; 126:S1-58.

DBPCFC is the “GOLD STANDARD”

- History: ~30% - 40% of histories confirmed
- Skin Tests: ~30% - 40% confirmed
- Elimination Diets: 0% - 40% of patients responding to elimination diet confirmed
- Open Challenge: 20% - 80% confirmed
Prick Skin Testing

Predictive Value of PSTs

Comparison of PST results & the outcome of 120 oral milk challenges - 37% positive
Wheat > 95% PPV
Milk ≥ 8 mm
Egg ≥ 7 mm
Peanut ≥ 8 mm
Peanut > 8 mm


Predictive Value of Food-specific IgE

Allergen     Decision Pt (kU L^{-1})

Egg
Milk
Peanut
Soy
Wheat
Tree nuts


Sampson JACI 2001; 107:891-903
Current Methods for Managing Food-induced Anaphylaxis

- Appropriate diagnosis of specific food allergy
- Education
  - strict avoidance of food allergen
  - learn to read food labels & recognize high risk situations
  - early signs of an allergic / anaphylactic reaction
- Provide emergency treatment plans in writing
  - FAAN website: www.foodallergy.org
- Provide self-Injectable epinephrine & liquid antihistamine
- Instructions to go to medical facility

Immunotherapeutic Approaches in Human Trials

- Allergen-specific Immunotherapy
  - Heat-denatured protein
  - Oral immunotherapy (OIT)
  - Sublingual immunotherapy (SLIT)
  - Epicutaneous immunotherapy (EIT)
- Allergen non-specific immunotherapy
  - Chinese Herbal medications
  - Anti-IgE immunotherapy