Food Allergies

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Case 1

- **What is the first medication you should give this child?**
  - **1) Benadryl**
  - **2) Zantac**
  - **3) IM Epinephrine**
  - **4) SC Epinephrine**
  - **5) Steroids**

Case 1

- **15 month old male presents to the ER with an acute onset of urticaria/facial angioedema/and wheezing. Symptoms began 5 minutes after he started eating scrambled egg. Family is unsure if he has ever been exposed to egg before. *Physical exam* is noteable for generalized urticaria, facial angioedema, mild wheezing and a BP of 65/35.**

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Food Allergy

- **Definition:**
  - ✓ **An adverse immune response to food proteins.**

Food Hypersensitivity Disorders

IgE mediated	
Gastrointestinal	**Oral allergy syndrome, gastrointestinal anaphylaxis**
Cutaneous	**Urticaria, angioedema, morbilliform rashes and flushing**
Respiratory	**Acute rhinoconjunctivitis, bronchospasm (wheezing)**
Generalized	**Anaphylactic shock**
Mixed IgE and cell mediated	
Gastrointestinal	**Eosinophilic esophagitis/ Gastroenteropathy**
Cutaneous	**Atopic dermatitis**
Respiratory	**Asthma**
Cell mediated	
Gastrointestinal	**Food protein -- induced enterocolitis Syndrome (FPIES)** **Food protein – induced proctocolitis (allergic colitis)** **Food protein – induced enteropathy syndromes** **Celiac disease**
Cutaneous	**Contact dermatitis, Dermatitis herpetiformis**
Respiratory	**Food-induced pulmonary hemosiderosis (Heiner syndrome)**

J Allergy Clin Immunol May 2004, 113:805-19

Food Allergy

- **More prevalent in westernized nations**
- **Incidence is increasing**
- **Anaphylaxis (IgE mediated) related to food allergies accounts for at least ⅓ to ½ of anaphylaxis cases seen in ED's.**

  J Allergy Clin Immunol 2001; 107:191-3, Clin Exp Allergy 2003; 33: 1033-40.
- **Food allergy is a major risk factor for severe life-threatening asthma.**

  J Allergy Clin Immunol 2003;112:168-174.

Causes of Adverse Reactions to Foods

- **Intolerance**
  - ✓ **Lactose intolerance, galactosemia**
- **Pharmacologic**
  - ✓ **Caffeine, tyramine in aged cheeses**
- **Toxins**
  - ✓ **Food poisoning**
- **Food Allergy**
  - ✓ **IgE mediated**
  - ✓ **Mixed IgE mediated and non-IgE mediated**
  - ✓ **Non-IgE mediated**

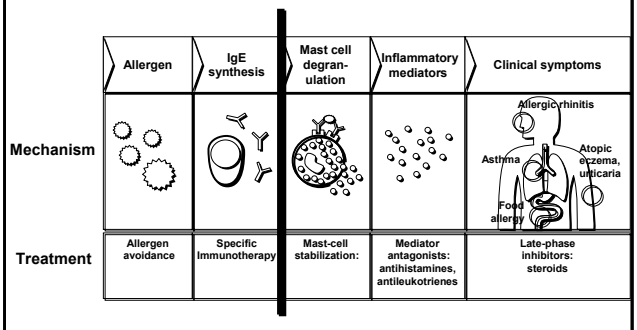
Symptoms: IgE Based Reactions

- Typically occur within 60-90 minutes
- Urticaria
- Angioedema (especially of face)
- Wheezing
- Vomiting/Diarrhea
- Rhinoconjunctivitis
- Anaphylaxis

Food Allergy

- Affects 6% of children under 3 years of age.
- 73% caused by Milk, Egg, and Peanut
  Journal of Pediatrics 1990;4:561-567
- Up to 95% of reactions in children are caused by: Milk, Eggs, Peanut, Tree Nut, Soy, Wheat and Fish
- 20% of peanut allergic children eventually develop clinical tolerance

IgE Mediated Responses



Adapted from Roitt J. Essential Immunology. 1994.

Prevalence of Food Allergy in the United States

Food	Young Children	Adults
Milk	2.5%	0.3%
Egg	1.3%	0.2%
Peanut	0.8%*	0.6%
Tree Nuts	0.2%	0.5%
Fish	0.1%	0.4%
Shellfish	0.1%	2%
OVERALL	6%	3.7%

J Allergy Clin Immunol 2004;113:805-19

Food Allergy

- 32 *fatal* food-induced anaphylaxis cases
  - ✓ 94% due to peanut and tree nuts
  - ✓ Majority are adolescents/young adults
  - ✓ Virtually all had history of previous reaction to the implicated food
  - ✓ Majority had asthma
  - ✓ Only 10% had epinephrine available

J Allergy Clin Immunol 2001; 107: 191-3

Diagnosis

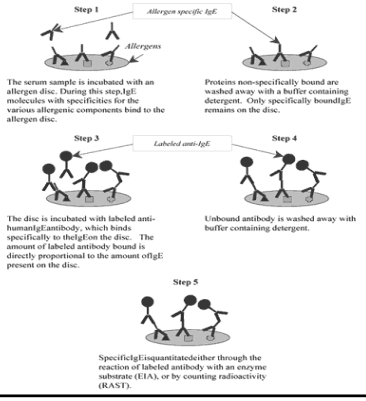
- Skin Prick Testing
  - ✓ Simple, generally safe
  - ✓ Results in 10 -20 minutes
  - ✓ Good negative predictive value (> 95%) but poor positive predictive value (< 50%)
  - ✓ Examples when difficult to perform: dermographism, patient cannot stop antihistamines
  - ✓ Age requirements

Clinical Diagnosis

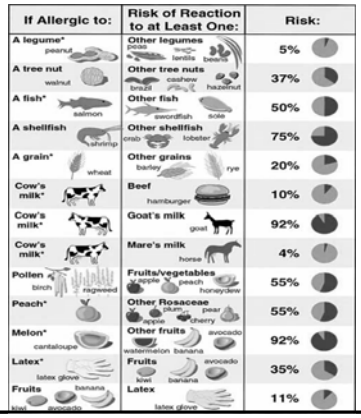
- History
  - What food had been eaten?
  - Time course of reaction
  - Symptoms and treatment of reaction
  - Previous exposure?
  - Other food allergies?
  - Other atopic disease?

Video Demonstration of Allergy Skin Test

In Vitro IgE (Cap-System FEIA)



Approximate rate of clinical reactivity to at least 1 other related food



J Allergy Clin Immunol Volume 108, Number 6

Food Challenges

- **Open**
  - ✓ **Easiest to perform**
  - ✓ **Child, parent, and health care team aware the patient is ingesting the possible allergen**
- **Single-Blinded**
  - ✓ **Possible allergen hidden in liquid such as grape juice**
  - ✓ **Health care team aware of when the patient is ingesting the sample with the suspected allergen**

Treatment

- **Currently is avoidance**
- **Early use of epinephrine**
- **Future Possibilities**
  - **Anti-IgE therapy**
  - **Desensitization**
  - **Genetic engineering**
  - **Immunotherapy using CpG motifs**

Patient Education

- If allergic to peanut / tree nuts, avoid bakeries, ice cream parlors, and Asian restaurants
- Demonstrate EpiPen using trainer
- Identification bracelet / necklace
- Communication with other caretakers
- Dietary consults
- Suggested Resource:
  - ✓ Food Allergy and Anaphylaxis Network www.foodallergy.org

Case #2

- A 12 y/o male is seen in your office for complaint of certain foods getting stuck in esophagus during eating. Other than some seasonal allergic rhinitis and rare heartburn, he has been previously healthy. Physical exam is unremarkable.
- You start him on a proton pump inhibitor bid, recommend he avoids caffeine, and suggest follow-up in 4 weeks.

Vaccine Use in Egg-Allergic Children

- Avoid influenza and yellow fever vaccines
- Red Book States that children with egg allergy may be given MMR without previous skin testing (vaccine derived from chicken egg fibroblast tissue cultures, but does *not* contain significant amounts of egg cross-reacting proteins)

…Case #2

- On follow-up, he tells you he is no better on the antacid, and twice in the past 2 weeks was unable to swallow meat, until it was washed down with extra milk purchased in the school lunch line.
- You subsequently refer him to GI, who performs an upper endoscopy.

…Case #2

- Which of the following would be the most likely diagnosis?
  - A) Candida esophagitis
  - B) Vocal cord dysfunction
  - C) Gastroesophageal reflux disease
  - D) Eosinophilic esophagitis

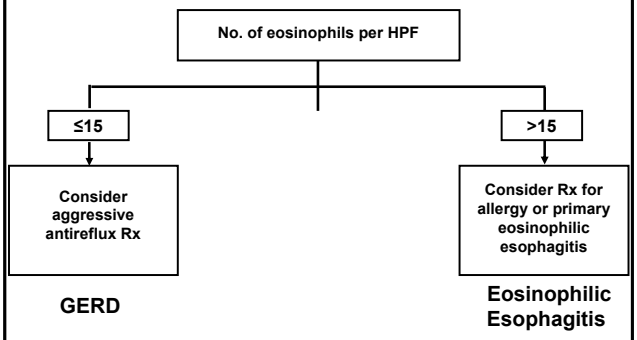
…Case #2

- Which of the following would be the most likely diagnosis?
  - A) Candida esophagitis
  - B) Vocal cord dysfunction
  - C) Gastroesophageal reflux disease
  - D) Eosinophilic esophagitis

Eosinophilic Esophagitis

- An immune reaction due to an IgE mediated, non-IgE mediated or combined response
- Characterized by infiltration of the esophagus with eosinophils
- Seen most often during infancy through adolescence

Pathology and Diagnosis of Eosinophilic Esophagitis



Clinical Features of Eosinophilic Esophagitis

Mean age at presentation (yr)	8 ± 0.9 (range, 1-16)
Sex (M/F)	14/5
Duration of symptoms before diagnosis (yr)	2.3 ± 0.6
Presenting complaints[a] (%)	
Dysphagia	58
Vomiting	42
Heartburn	37
Abdominal pain	32
Food impaction	11
Failure to thrive	11
Diarrhea	5
Family history of allergic disease (%)	58
Personal history of allergic disease (%)	84
Peripheral eosinophilia (%)	58

[a]Some patients had more than 1 presenting symptom.

Teitelebaum JE. Gastroenterology 2002; 122:1216-1225

Eosinophilic Esophagitis: Clinical Features in INFANTS

Symptoms may be more vague

- ✓ Feeding refusal
- ✓ Early satiety
- ✓ Failure to thrive
- ✓ Poor weight gain

Case #3

- A 12 month old girl with a history of eczema since age 4 months is brought into your office for her well visit. During the interview, you note she is continuously scratching her legs. Mom reports antihistamines and numerous topical creams, including steroids and emollients, have resulted in minimal improvement.

Eosinophilic Esophagitis

- Commonly, but not always attributed to food allergy (68% (+) Skin test +/- RAST).

  J Allergy Clin Immunol 2002; 109:363-8.
- Treatment options
  - Food elimination or hypoallergenic formula
  - Swallowed topical steroid treatment
- Long term prognosis unclear
  - Strictures in some

Case #3

- In reviewing her history:
  - ✓ On milk formula since shortly after birth. Started solids at 4-5 months
  - ✓ On 3 courses of antibiotics for secondarily infected skin.
  - ✓ No history of urticaria, abscesses or pneumonia.
  - ✓ Exam is significant for generalized xerosis, areas of erythema with some scaling on the trunk and extremities, and lichenification with excoriation over the hands, wrists, and ankle areas.

Case #3

Case #3

- **Which of the following is true?**
  - **A. The likelihood she has a food allergy is at least 30%**
  - **B. She meets the criteria for Hyper IgE (Job's) Syndrome**
  - **C. She is unlikely to develop asthma**
  - **D. She is a candidate for Xolair (omalizumab), the anti IgE antibody**
  - **E. She should stop using soap during baths**

Case #3

- **While awaiting dermatology and allergy appointments, you obtain a CBC with diff and an IgE level.**

WBC	**12.2**	**(6-17.5)**	**K/cu mm**
53 Lymphs / 39 Neutrophils / 3 Monos / 5 Eos			
HGB	**11.7**	**(10.5-13.5)**	**g/dL**
HCT	**36.4**	**(33-39)**	**%**
PLT	**248**	**(140-440)**	**K/cu mm**
IgE	**7,332**	**(0-75)**	

Case #3

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Atopic Dermatitis

- The strength of association between IgE-mediated food allergy and atopic dermatitis increases with the increasing severity of the atopic dermatitis
- For those most severely affected, 69% had IgE food allergy

Pediatr Allergy Immunol 2004: 15:421-27

Case #4

What would you be most likely to do?

A) Prescribe an Epi-Pen and recommend he avoid bananas and all melons

B) Explain to him he has Oral Allergy syndrome, and should avoid foods that cause symptoms

C) Tell him it's all in his head, and refer for psychiatric evaluation

Case #4

- A 16 year old boy with seasonal allergic rhinitis most noticeable in the late summer and fall complains of itching on roof of mouth and throat whenever he eats banana or cantaloupe.
- He denies the sensation of throat closing, and has no rash or respiratory distress.

Case #4

What would you be most likely to do?

A) Prescribe an Epi-Pen and recommend he avoid bananas and all melons

B) Explain to him he has Oral Allergy syndrome, and should avoid foods that cause symptoms

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Pollen-Food Allergy / Oral Allergy Syndrome

- A syndrome elicited by a variety of plant proteins (fruits or vegetables) that cross-react with airborne allergens and lead to pruritis of oral mucosa
- Symptoms: pruritis / mild angioedema
- Symptoms usually limited to oropharyngeal mucosa because allergens responsible for these reactions are easily degraded.
- Heat-labile: Cooking usually abolishes reaction

Case #5

- A 3 week old female presents with 2 days of small amounts visible blood mixed in stool.
  - ✓ No fever
  - ✓ Loose, pasty, mucousy stool (not watery)
  - ✓ Not irritable, no eczema
  - ✓ Acting normal
  - ✓ Born term (39 4/7 weeks)
  - ✓ Family history negative for bleeding disorders or recurrent infections
  - ✓ On dairy based infant formula

Pollen-Food Allergy / Oral Allergy Syndrome

POLLEN	CROSS REACTING FOOD
Ragweed	Fresh melon, banana
Birch	Raw potato, carrot, celery, apple, pear, peach, kiwi
Grass Pollen	Raw tomato
Mugwort	Carrot, celery, fennel, parsley

Case #5

- Physical Exam
  - ✓ Afebrile, VSS
  - ✓ No apparent distress
  - ✓ Chest: Clear
  - ✓ CV: RRR. Normal S1 and S2, no murmurs
  - ✓ ABD: Abdomen non-distended, no visible loops. Normal bowel sounds. Soft, non tender, no abnormal masses
  - ✓ Skin: no rash / jaundice / petechiae

Case #5

- Which of the following is the most likely diagnosis?

A) IgE mediated hypersensitivity

B) Intussusception

C) Allergic Colitis (Food Protein Induced Proctocolitis)

D) Food Protein Induced Enterocolitis Syndrome

E) Wiscott Aldrich Syndrome

Food Protein-Induced Proctocolitis (Allergic Colitis)

- Relatively benign disorder due to cow's milk, sometimes soybean
- Characterized by inflammatory changes in the rectum and colon due to immune mediated reactions to ingested foreign proteins
- Non-IgE mediated, presents in 1st few months
- Results in bloody, mucousy stool
- Can also occur in breast-fed infants
- Histology: focal eosinophil infiltrates (biopsy not required to confirm diagnosis)

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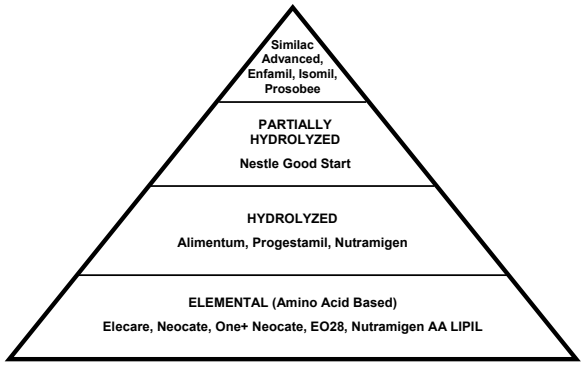
Formula Guide Pyramid



Prevention of Food Hypersensitivity: *Current* AAP Recommendations

- **High-risk infants exclusively breastfeed**
- **Breast feeding mothers avoid peanuts and tree nuts**
- **Delay introducing solids until 6 months**
- **No egg until age 2 years**
- **Introduce peanuts, nuts and seafood after age 3 years**

Prevention of Food Hypersensitivity: *Future Recommendations??*

- **At this time, the only intervention likely to decrease incidence of atopy is attempt to exclusively breast feed for 1st 6 months of life in genetically predisposed infants.**