

26th Annual General Pediatric Review & Self-Assessment

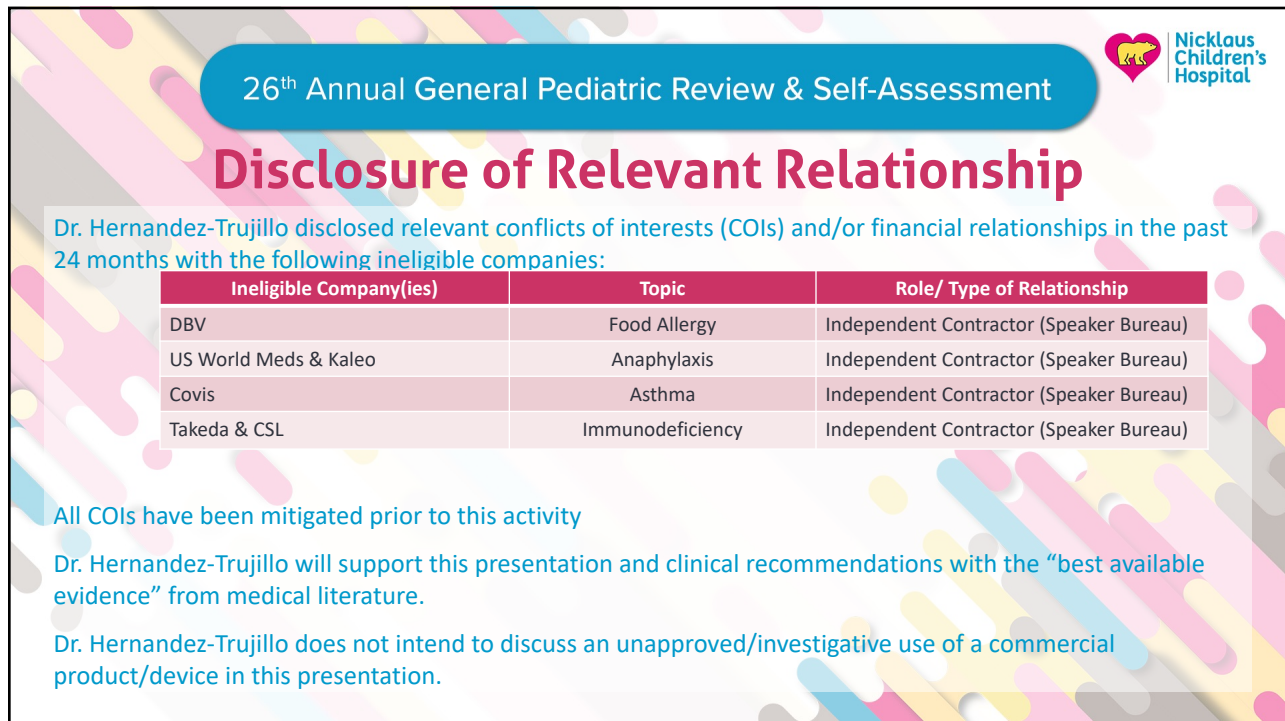
ALLERGY

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1



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Disclosure of Relevant Relationship

Dr. Hernandez-Trujillo disclosed relevant conflicts of interests (COIs) and/or financial relationships in the past 24 months with the following ineligible companies:

Ineligible Company(ies)	Topic	Role/ Type of Relationship
DBV	Food Allergy	Independent Contractor (Speaker Bureau)
US World Meds & Kaleo	Anaphylaxis	Independent Contractor (Speaker Bureau)
Covis	Asthma	Independent Contractor (Speaker Bureau)
Takeda & CSL	Immunodeficiency	Independent Contractor (Speaker Bureau)

All COIs have been mitigated prior to this activity

Dr. Hernandez-Trujillo will support this presentation and clinical recommendations with the “best available evidence” from medical literature.

Dr. Hernandez-Trujillo does not intend to discuss an unapproved/investigative use of a commercial product/device in this presentation.

2

Outline

- Review of Allergies/ Atopy
- Anaphylaxis
- Bees, Wasps and other Stinging Insects
- Congestion and Coryza (ie: Rhinitis)
- Drug Allergy
- Eczema/Atopic Dermatitis
- Food Allergy
- Diagnosis/ Workup of Allergies
- Treatment
- Referral

4

Atopy

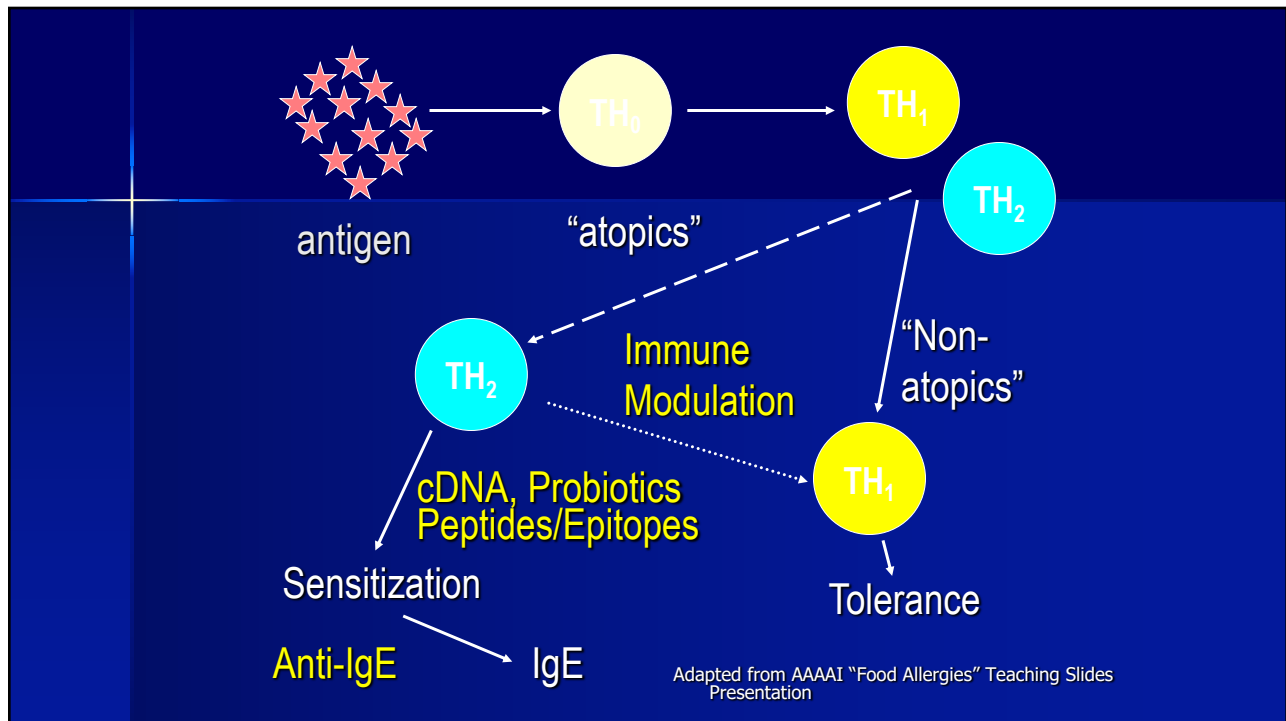
- Results from sensitization to an allergen
- Does not occur without prior sensitization**
- Many times patients are sensitized without knowing it- especially to foods/drugs
- Often seen in families- genetics is important
- 20-30% General Population
- 10-15% Children

5

Atopy

- The incidence of atopy (eczema, allergic rhinitis, asthma) is over 80% infants whose parents are both atopic and have ↑ cord IgE
- Both parents atopic → 50% **(72% if same type)**
One parent or sibling atopic → 29% Neither parent atopic → 13%
- Male/female ratio atopy in children 1.8:1

6



7

Anaphylaxis

- Severe and life-threatening allergic reaction
- Occurs secondary to food, stinging insect, drugs, other allergens
- Often missed by clinicians- not all patients have hypotension
- Epinephrine is life-saving and first treatment that should be given at onset of symptoms

8

Case Study

A 6 year old male is stung by a wasp. He develops urticaria and swelling of the site. What recommendation should you make?

- A. Allergy testing for wasp in one week
- B. No allergy testing- avoidance
- C. Daily antihistamines to avoid possibility of reaction
- D. Immediate desensitization

9

Stinging Insects



11

Bees, Wasps, Stinging Insects

- Stinging insects are common causes of anaphylaxis-yellow jacket, hornet, wasp, honeybee, bumblebee, fire ant
- No workup is needed (or possible) for large local reactions to mosquitoes**
- Care of large local reactions- cold compress; mix hydrocortisone/ topical diphenhydramine/ topical antibiotic ointment; oral antihistamine if very itchy

12

Insect Allergy

- In children <16 years old, hives, large local reactions after stinging insect bite is not an indication for testing and immunotherapy
- In children \geq 16 years, generalized hives, shortness of breath, etc is an indication for testing- invasive- if plan is for immunotherapy
- New Practice Parameters for Venom Allergy were released one month ago

13

Insect Allergy Recommendations

- Patients with a history of systemic reactions to insect stings should:
 - carry epinephrine for emergency self-treatment
 - avoid areas with possible exposure
 - undergo specific IgE testing for stinging insect sensitivity and be considered for immunotherapy
 - consider obtaining a medical identification bracelet or necklace

14

Fire Ant Allergy

- Fire Ants cause large local reactions
- One ant will bite several times, often in a circle, leading to a toxic reaction
- Cellulitis can result- treat with oral antibiotic- many will improve



15

Insect Allergy

- In patients with true allergy to stinging insects, should be given a prescription for epinephrine autoinjector and referral for testing/immunotherapy
- Immunotherapy 5-7 years
- Patients with systemic mastocytosis have higher likelihood of severe anaphylaxis to stinging insects

16

Congestion (ie: Rhinitis)

- Part of the allergic triad (along with atopic dermatitis and asthma)
- 10-15% General Population
- Frequently seen in patients with environmental allergies
- Common causes include house dust mite, pet dander, cockroach, molds and pollens
- May influence ability to sleep- quality of life
- Seasonal Allergic Rhinitis- due to pollens
- Perennial Allergic Rhinitis- due to dust mite, pet dander, cockroach, indoor molds

17

Look at my Allergic Shiners!!

- Dennie Morgan Lines or allergic shiners



18

Drug Allergy

- Often challenging
- Diagnostic testing is not easy- resources/materials needed for reliable testing to antibiotics are not available
- Avoidance of suspected drugs leading to reaction
- Reliable testing is now available to penicillin if IgE mediated- not serum sickness or Stevens Johnson **
- Desensitization necessitated if antibiotic absolutely needed
- Many alternatives are available these days

19

Gell and Coombs' Classification of Allergic Reactions

- Type I: IgE-mediated immediate-type hypersensitivity (anaphylaxis to antibiotics, allergic asthma)
- Type II: IgG and IgM cytotoxic antibody (hemolytic anemia, granulocytopenia, thrombocytopenia from penicillin, Goodpasture's)
- Type III: antibody-antigen immune complex (serum sickness from penicillin or heterologous antisera, SLE)
- Type IV: delayed-type cell-mediated hypersensitivity (contact dermatitis from neomycin, poison ivy, granuloma)

20

Case study
A patient has a severe allergic reaction during a CT Scan with contrast media. Which of the following recommendations would you make?

- A. Avoid all use of contrast media in the future
- B. Avoid all iodine-containing seafood products
- C. Avoid premedication prior to the next study
- D. Premedicate with antihistamines and steroids

21

Contrast Media Reactions- Non-IgE Mediated

- Mediated through a mechanism other than IgE
- Patients should have low osmolar contrast agent used
- Patients should be premedicated with steroids 13, 7 and one hour prior to study, diphenhydramine one hour prior and ephedrine one hour prior to avoid reaction
- No correlation exists between shrimp allergy/iodized salt and contrast allergy!!

23

Eczema/ Atopic Dermatitis

- Common in infants and young children
- 1-3% General Population
- In patients with moderate to severe eczema, 1/3 will have food sensitivity
- Hydration, Moisturization, use of antihistamines for itching, and avoidance of known allergens are essential
- Recent studies reveal use of emollients helps decrease the risk of eczema
- Important for above to be continued when skin clears- skin is not "normal" even when no lesions are visible

24

Food Allergy

- Frequent cause of allergic reactions and anaphylaxis in children of all ages
- Allergy confirmed: Children 6-8% Adults 2-3.5%
- Cow milk**, soy, egg, wheat and peanut are the most common allergens in children
- Most common, outgrow cow milk, soy, wheat and egg allergy
- 85% Wheat, soy allergy remit by 3 yrs
- Rarely lose allergy to peanut, tree nuts, seafood
- Avoidance is imperative

25

ARS Question

- What is the current recommendation regarding infant feeding in a child with mild eczema?
 - A. Introduce solids at 3 months
 - B. Exclusive breastfeeding until 6 months
 - C. Introduce Peanuts at 6 months
 - D. Introduce Peanuts at 24 months

26

New diets for infants



28

Peanut Allergy Recommendations

- Study by G Lack and G DuToit 2015 LEAP study Feb 2015 NEJM
- Look at infants with severe eczema, egg allergy or both, considered at risk for developing PN allergy
- Randomized infants between ages of 4 and 11 months into 2 groups- consume versus avoid peanuts

29

LEAP study NEJM 2015

“The early introduction of peanuts significantly decreased the frequency of the development of peanut allergy among children at high risk”

30

Food Allergy

- New Guidelines have revolutionized our recommendations!
- **No longer recommended to avoid “highly allergenic” foods in hopes of decreasing prevalence of food allergy**
- Infants 4-6 months recommended to introduce solids- even egg, peanut, fish after traditional solids introduced
- No new food introduction if patient is sick***

31

Food Allergy



- Peanut Guidelines
- Infants with either egg allergy, severe eczema or both, should be evaluated by testing to peanut prior to introduction- depending on results, determine whether should introduce and/or perform supervised oral challenge
- Infants with mild to moderate eczema should be introduced to peanut protein at 6 months
- Infants with no eczema or egg allergy should be introduced at the preference of the parents
- Always keep in mind the form of food for infant- discuss choking risk

32

New treatment for Peanut Allergy

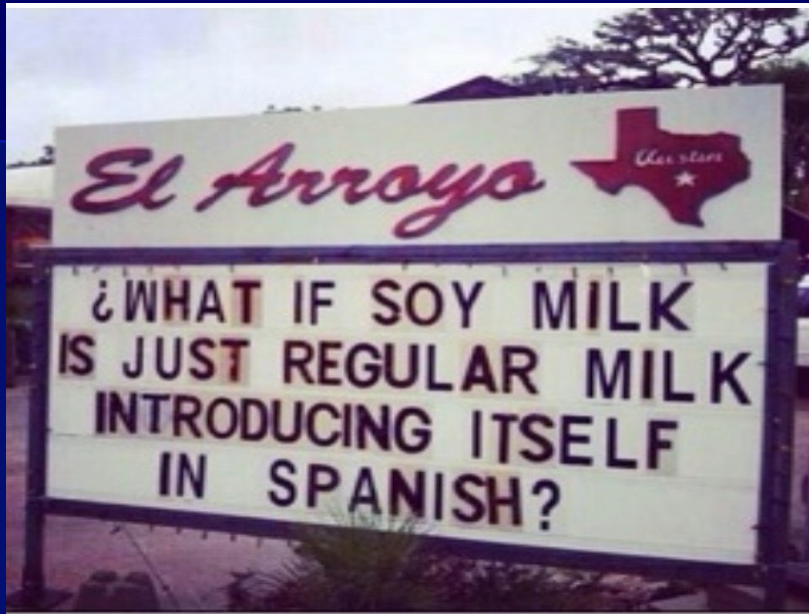
- In 2020, first FDA approved oral immunotherapy for peanut for patients age 4-17 years old
- **Reminder- if patient reacts to food and has food allergy- need for strict avoidance exists **

33

Challenge with Anaphylaxis to known food allergen

- Recent stories of children dying due to food allergy reaction treated with oral antihistamine either before epinephrine or never receiving epinephrine due to "masked" signs and symptoms- **beware** of recommending oral antihistamine in child with known anaphylaxis to food
- Anaphylaxis Action plans- Epinephrine first, then ER
www.aaaai.org

34



35

Case Study

A 1 year old with egg allergy is due for the MMR? What is your recommendation for the patient?

- A. Do not give the MMR
- B. Skin testing to MMR, give if negative
- C. Skin testing to MMR, desensitize if positive
- D. Give MMR without testing

36

Egg allergy and vaccines

- MMR can be given to egg allergic patients (AAP Red Book)
- Recent changes and reports of patients with egg allergy tolerating influenza vaccine- recommendations include giving influenza to egg-allergic patients. If anaphylaxis to egg, observe after influenza vaccine administration.
- Vaccines that should be avoided in egg allergic patients: Yellow fever

38

Hives/Urticaria

- The challenge for allergists, pediatricians and patients alike
- Often difficult to treat because no clear allergen is found
- Important to consider quality of life
- May need multiple medications to ensure symptomatic relief
- Up to 6-8 weeks- Acute
- More than 6-8 weeks- Chronic

39

Acute Urticaria and Angioedema (< 6 wk)

- Usually develops a short time from ingestion of allergen, resolves within hours
- More commonly IgE mediated
- Increased likelihood of finding etiology
- Beware- may be early sign of anaphylaxis

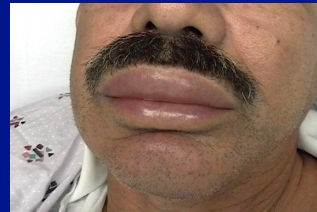


Image from AAAAI Urticaria and Angioedema Committee Slide Set 2006

40

Acute Urticaria and Angioedema: Etiology

- Viral syndromes (especially in young children)
- Insect bites or stings (fire ants, scabies)
- Food induced reactions (eat this- get that)
- Medication related (antibiotics, NSAIDs, narcotics, angioedema due to ACE inhibitors)



Slide and Images from AAAAI Urticaria and Angioedema Committee Slide Set 2006

41

Chronic Urticaria /Angioedema (> 6 wk)

- Chronic Urticaria – lasting longer than 8 weeks
 - Physical urticarias (dermographism, cholinergic, cold)
 - Urticarial vasculitis ****
 - Urticaria/angioedema associated with autoimmunity
 - Autoimmune urticaria (Autoantibodies to high affinity IgE receptors)
 - Idiopathic urticaria
- Chronic Idiopathic Urticaria Only 10% etiology defined
- Biopsy if lesion persists in same location for > 24 hours or purpuric




Image from health-pictures.com
Slide and Images from AAAAI Urticaria and Angioedema Committee Slide Set

42

Physical Urticaria

- Physical Urticarial Types
 - Symptomatic Dermatographism
 - Cholinergic
 - Cold Induced (Familial or Acquired)
 - Vibratory (angioedema)
 - Pressure – induced, Solar, Aquagenic

43

Dermatographism

- Simply scratching the skin promotes linear hives within minutes
- Delayed form described
- Typically is short-lived in duration (1/2 to 3 hours) and responds readily to antihistamines



Image and slides adapted from AAAAI Urticaria and Angioedema Committee

44

Workup of hives

- Acute hives Observe
- Ask about ibuprofen/NSAID use prior to hives
- Infections are #1 cause of hives
- **Do not order random food tests** due to pressure from the families- this will bring more problems in the long run due to false positives and likelihood of missing true cause
- May treat with oral antihistamine course of 5-30 days to see if hives resolve

45

Workup of chronic hives

■ Chronic Urticaria

- Not likely to find cause
- No reason to perform Immucap to food or environmental allergens on every patient
- Thyroid, Acute Hepatitis, Lupus Analyzer and Urine analysis

46

Case Study

A three year old girl presents with episodes of facial swelling and abdominal pain. The episodes have occurred on four separate occasions. No other symptoms- ie: urticaria seen. The initial workup should include:

- A. C1
- B. C3
- C. C4
- D. C6

47

Hereditary Angioedema

- Autosomal dominant with incomplete penetrance
 - Spontaneous mutations in 50%
 - Diminished C4 between attacks
 - Very low C4 during attacks
 - C1 esterase inhibitor protein low in about 85% of cases
 - C1 esterase inhibitor only functionally deficient in about 15%



Image from health-pictures.com

Image and slide adapted from AAAAI Urticaria and Angioedema Committee Slide Set

49

Hereditary Angioedema



Image adapted from AAAAI Urticaria and Angioedema Committee Slide Set

50

Hereditary Angioedema

■ Treatment:

- No regular medication needed in many cases
- Prophylactic stanozolol or danazol; C1 esterase inhibitor for adults and children 12 years and older
- Epsilon aminocaproic acid (EACA) an option
- Fresh frozen plasma before emergency surgery
- C1 esterase inhibitor and kallikrein inhibitor- available for adults and children
- Symptomatic treatment during attacks

Slide adapted from AAAAI Urticaria and Angioedema Committee Slide Set

51

Importance of IgE

- Obtain Total IgE when Specific IgE tests are ordered- if Total IgE is very high, may have nonspecific binding therefore use care with interpretation
- Useful for diagnosis in patients with severe skin disease, patients unable to stop antihistamines or tricyclic antidepressants, when risk of anaphylaxis is great based on history, uncooperative patients- behavior/autism

52

Importance of IgE

- Epicutaneous/ skin prick testing (SPT) is sensitive- more so than specific IgE- therefore the preferred method/ standard of care
- Total IgE is elevated in several diseases including Atopic Dermatitis, Parasitic Diseases, Hyper IgE syndrome, HIV, Allergic Bronchopulmonary Aspergillosis

53



54

Diagnosis of Allergies

- Testing is often needed to clarify whether a suspected allergen is indeed the cause of the reaction
- Skin prick testing is most sensitive test
- Prick skin test confirms the absence of IgE: negative predictive accuracy > 95%
- Immunocap/Specific IgE is specific- confirms **sensitization (not necessarily clinically significant allergy) to a food**- scale of Class 0 (negative) to Class VI (>100) very positive
- Beware of children with elevated IgE- "all" specific tests may look positive
- Interpretation in these cases requires careful review of history and correlation with Immunocap results

55

Diagnosis of Allergies

- In patients with one allergen Class I- may be clinically significant
- In patients with elevated IgE, class I may not be significant. Either way, observation with the food is essential to confirm this.
- Class VI more likely to be a significant allergen

56

Case Study

Which of the following is an indication for immunotherapy?

- A. Food Allergy
- B. FPIES
- C. Asthma
- D. Urticaria

57

Indications for Immunotherapy

- The indications for immunotherapy include:
 - Asthma
 - Allergic Rhinitis- seasonal and perennial
 - Hymenoptera
 - Atopic Dermatitis- Dust
- Subcutaneous immunotherapy/ desensitization; Sublingual tablets approved for 5 grass mix in children 10 years and older for allergic rhinitis

59

Diseases NOT Indications for Immunotherapy

- Urticaria/Angioedema
- Migraines
- Behavior Issues

60

Treatment

- Avoidance, Avoidance, Avoidance in Anaphylaxis, Stinging insects, Drug Allergy, Atopic Dermatitis, Food Allergy and Urticaria
- Epinephrine in Anaphylaxis, Stinging Insects
- New FDA approved treatment option in peanut allergy only: oral immunotherapy

61

Treatment

- Other medications in:
- Atopic Dermatitis- antihistamines/topical creams
- Urticaria- antihistamines- often multiple; Chronic idiopathic urticaria refractory to treatment- Omalizumab
- Rhinitis- Topical steroids** Gold standard/antihistamines-oral +/- topical/antileukotrienes

62

Treatment

- Immunotherapy in Stinging Insect Allergy
- Allergic Rhinitis
- Asthma
- Atopic Dermatitis to Dust

- No immunotherapy in urticaria/angioedema at this time

63

References

- AAAAI website. www.aaaai.org