Hives in Children

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Objectives

- To review the causes of acute urticaria in children
- The review mast cell degranulation and pathophysiology of hives
- To review penicillin allergy in children and how it relates to acute hives
- To understand the differences between acute and chronic urticaria

What are hives?

- Raised wheals with surrounding erythema
- Usually very itchy
- Sometimes burn if they are deeper in the dermis
- Angioedema can be associated with hives and is not necessarily a separate entity

Hives are NOT:

- Bruising
- Purpuric
- Petechial
- Peeling
- Painful
- Vesicular
- Fluid-filled
- Fine “sandpaper” rash
- Lasting longer than 24 hours

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Pathophysiology
Common Causes of Acute Urticaria

- >80% are due to infection: viral, viral, viral!
- Strep infection
- Mycoplasma
- Drug reaction (beta lactam, cephalosporins)
- Foods: egg, milk, peanut, tree nuts, seeds, shellfish, fish
- Insect sting or bite

- Hives from a particular allergic trigger like a food will occur within 30 minutes of eating
- If a child has had hives for several days, it is NOT due to a food
- Hives for several days are almost always due to an infectious trigger
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Case
- 3 year old little boy with runny nose, low grade fever and cough for past 4 days
- You diagnose him with a URI

Case
- Also complaining of ear pain in left ear
- On exam left TM is red and bulging
- You start him on amoxicillin

Case
- On day 7/10 of amoxicillin he breaks out into a rash with raised wheals and surrounding erythema
- You see him back and note that he has acute urticaria
Case

- You stop the amoxicillin
- The hives continue on and off for the next week and mom says they become less frequent and less severe

Were the hives from the infection or from the amoxicillin?

Caubet et al. 2011

- Enrolled 88 pediatric patients with a history of hives while taking beta lactam antibiotics during upper respiratory tract infection (amoxicillin or augmentin)
- All patients were skin tested to penicillin (PrePen and Minor Determinant Mix) and to Amoxicillin
- All patients underwent an oral challenge, regardless of skin test results


Caubet et al. 2011

- 6/88 patients had positive oral challenge with hives or rash
- 4/6 of those had positive skin testing

In the Pediatric Allergy Clinic we can evaluate these children

- Skin prick testing to penicillin
- Intradermal skin testing
- Oral Challenge to Amoxicillin or drug of interest

Penicillin Skin Testing

- Penicillin skin testing using PRE-PEN and penicillin G has good negative predictive value in excluding penicillin allergy (96-99%)

Macy, et al. JACI In Practice 2013;1:258-63
Programmatic Highlights

- Jan – Nov 2016
  - Penicillin Skin Test (PST) Protocol approval, order panel and progress note development, operationalization of product preparation, and PST training
- Feb. 2016
  - Enhanced allergy screening provided by pharmacy clinical interns
- December 2016
  - Implemented Stewardship Allergy Assessment Team
    - Two ID Pharmacists
    - One Allergy Fellow: Renee Kleris, MD

Penicillin Skin Testing (PST)

**Screening**
- Non-urgent
- Immuno-competent
- Benefit from penicillin or other beta-lactams

**Assessment**
- Reaction type
- How long ago
- Tolerance of other beta-lactams
- Current medication profile review

**PST or Desensitization**
- PST will be considered in adult patients with Type 1 rxn > 5 years ago

Penicillin Skin Testing

- Bioassay that has been used for 20 yrs
- Reagents used: Pre-Pen®, diluted Penicillin G, histamine, normal saline
- Three steps:
  - Skin prick
  - Intradermal
  - Oral challenge with amoxicillin
- Time Frame: 3 hours
- Test done bedside in patient room

PST Orders and Follow Up

ASET/StAAT:
- Coordinates time with nursing to perform test
- Enters orders for qualified patients
- Completes progress note and all results are communicated to primary team
- Removes penicillin allergy from Epic allergy tab for PST-negative patients
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- Enrolled 65 children with acute urticaria that did not respond to antihistamines
- Tested them for mycoplasma pneumonia (IgM and cold agglutination)
- 32% were positive for Mycoplasma


- Patients with M pneumoniae were treated with azithromycin (10mg/kg/day) for 3 days
- Treatment with Azithromycin resulted in a statistically significant decrease in duration of hives

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Many rashes will be described by parents as “hives” but are not actually urticaria.

It is always helpful to see photos!

Differential Diagnosis

- Viral exanthem
- Atopic Dermatitis
- Contact Dermatitis
- Drug Eruptions
- Insect bites

- Urticarial vasculitis
- Mastocytosis (Urticaria pigmentosa)
- Autoimmune Disease (Lupus, Rheumatoid Arthritis, Sjogran Syndrome, Celiac Disease, Thyroid Disease)
- Henoch-Schonlein Purpura
- Bullous pemphigoid
Chronic Urticaria

- If child has had hives several days per week for >6 weeks this is considered chronic urticaria
- Chronic urticaria is usually idiopathic
- Likely due to an autoimmune trigger like an IgG antibody that binds to the high affinity IgE receptor mast cells

- If the family cannot figure out a pattern at home for a trigger then there probably isn’t a trigger
- Chronic hives are not from a food or an environmental trigger in the home
- Self-limited but we cannot predict how long they will last
- In rare cases, they last years
Chronic Urticaria ≠ anaphylaxis

- Chronic urticaria does not lead to anaphylaxis
- Anaphylaxis occurs when there is a discrete exposure to an allergen and symptoms start within minutes of the exposure

Physical Urticaria: Dermatographism

Physical Urticaria

- Heat
- Cold
- Pressure
- Vibration
- Exercise
- Water
- Sunlight
Treatment for Acute Hives

- Antihistamines
  - Cetirizine, fexofenadine, loratadine
  - Often have to go to BID dosing
- Add ranitidine
- Add montelukast
- Avoid steroids if you can

Treatment for Chronic Urticaria

- Antihistamine daily (cetirizine 5-10 mg)
  - Can increase to BID
- Add ranitidine (75-150mg)
- Add montelukast (age appropriate dosing)
- Avoid Steroids!
- Omalizumab (approved for 12 years and older)
- Immune suppressive agents like cyclosporine

Review

- Acute urticaria in children is likely virally triggered
- If symptoms occur within a short period after eating then consider food allergy
- Penicillin allergy is a rare but possible cause of hives in children

Review

- We should evaluate and skin test children who have been labeled as possibly allergic to PCN
- Chronic hives in children is unusual but can last for months to years
Questions?