I’m Allergic!
The Conundrum of Antibiotic Allergies

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• Don’t overuse non-beta lactam antibiotics in patients with a history of penicillin allergy, without an appropriate evaluation.
Objectives:

• classification of allergic reactions
• testing for penicillin allergy
• what about cephalosporins?
Conflicts of Interest: none
Impact of Antibiotic Allergy Labelling

- Increased inpatient and outpatient treatment costs
- Longer hospitalizations, more readmissions
- More adverse reactions
- Increased antibiotic resistance
- Increased incidence of C. difficile colitis, VRE, MRSA
Gell and Coombs Classification

Type I
- Mast Cell
- Drug Antigen
- IgE
- Mediator Release

Type II
- Cell-Bound Antigen
- Antibody
- Red Cell

Type III
- Complement
- Polymorphonuclear Leukocyte
- Antibody

Type IV
- Macrophage
- Processed Antigen
- Antigen
- Sensitized T Cell
- Cytokines
Type IV Hypersensitivity Reactions

Toxic epidermal necrolysis

Acute generalized exanthematous pustulosis

• Acute Interstitial Nephritis
• Drug-induced Liver Disease

DRESS:
Acute skin rash-maculopapular
Internal organ involvement
Lymphadenopathy ≥2 sites
Abnl blood count- at least 1:
  -lymphocytosis/penia
  -eosinophilia
  -thrombocytopenia
Fever > 38°C
Urticaria with angioedema
Reported penicillin allergy

Severe Type II-IV reaction or Anaphylaxis <1-6 mo ago

Skin Prick test
PrePen, Pen G, controls
Read after 15”

Intradermal test
(+) test = wheal >3mm more than saline control

Oral challenge with Amoxicillin 250-500 mg
Observe 1 hour

Safe to receive Penicillin

No Further Testing
Avoid Penicillins
Coming Soon - Stay Tuned!
Cephalosporins in PCN-Allergic Patients

- Cross-reactivity is uncommon!
- Cross-reactivity related to similar/shared R side chains
- Amp/amox share R side chains with several 1st and 2nd generation cephalosporins
Cephalosporins in PCN-Allergic Patients

- Skin testing for cephalosporin allergy is unreliable
- **OK** to use 3\textsuperscript{rd} and 4\textsuperscript{th} generation cephalosporins, cefazolin
- Use **graded challenge** for 1\textsuperscript{st} and 2\textsuperscript{nd} generation with dissimilar R chains
- **Avoid** 1\textsuperscript{st} and 2\textsuperscript{nd} generation with similar R chains
- Cross-reactivity with carbapenems rare (<<1%), absent with aztreonam

<table>
<thead>
<tr>
<th>Cephalosporins and Penicillins with Identical Side Chains</th>
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<tbody>
<tr>
<td><strong>Amoxicillin</strong></td>
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<tr>
<td>Cefadroxil</td>
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<td>Cefprozil</td>
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<td>Cefatrizine</td>
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<td>Cephaloglycin</td>
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<td>Loracarbef</td>
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What about other antibiotic allergies?

- Skin testing for IgE hypersensitivity: only Penicillin
- In vitro (blood tests) not reliable for diagnosing drug allergies
- Can consider oral challenges after mild-to-moderate skin rash reactions
- No safe testing after severe Type II-IV reactions
Summary

• Falsely labelled antibiotic allergies ➤ significant morbidity, cost, resistance
• Take a careful drug allergy history!
• Test to rule out IgE-mediated PCN allergy ➤ de-label!
• Cephalosporin cross-reactivity with PCN is very uncommon
• Limited ability to test for non-penicillin antibiotic allergies
References


• Duong TA, Veleyrie-Allanore L, Wolkenstein P, Chosidow O. Severe Cutaneous Adverse Reactions to Drugs. Lancet May 2, 2017 online (DOI: 10.1016/S0140-6736(16)30378-6)

• Pichichero, ME. Cephalosporins can be prescribed safely for penicillin-allergic patients. J Fam Pract. 2006;55(2):106-112