Retrospective Review of Penicillin Allergy Documentation within an Electronic Medical Record and Application to Allergy Triage for Inpatient Penicillin Allergy Testing

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Disclosures
Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

• Hannah D. Fjeld: Nothing to disclose
• Ryan W. Stevens: Nothing to disclose
**Background**

- Penicillin (PCN) allergies are the most common self-reported allergy.
  - Estimated population prevalence of 10\%.\(^1\)
  - \(\sim \)10\% of reported penicillin allergies represent an IgE mediated process
- Impact of PCN allergy listed in patient medical record
  - Cephalosporins are often withheld given concerns of a 3-5\% risk of cross reactivity.\(^2\)
  - Associated avoidance of beta-lactam antibiotics has been associated with adverse clinical outcomes, antibiotic resistance and higher cost of care.\(^2\)
- Penicillin skin testing (PST) is endorsed by the American Academy of Allergy Asthma and Immunology to be utilized for pts with self-reported PCN allergies.\(^3\)

**Objective**

1. Evaluate the number of pts who may be appropriate for inclusion in a PST protocol using comprehensive eMR review.

2. Evaluate the utility of the current eMR allergy documentation when used alone vs full eMR review to identify potential candidates for PST.
Inclusion Criteria:
• Documented PCN allergy
• Inpatient admission at index facility between 9/15/2016 and 9/14/2017
• Receipt of any antibiotic as an inpatient during above admission

Exclusion Criteria:
• Documented allergy to multiple beta-lactam classes (i.e. PCN and cephalosporin)

652 pts included for final review

Current eMR Allergy Record Documentation Layout

• Reaction Options
  - Anaphylaxis
  - Hives
  - Shortness of Breath
  - Swelling
  - Rash
  - Nausea and Vomiting
  - Nausea Only
  - Diarrhea
  - Itching
  - Sensitivity
  - Other (See Comments)
  - Unknown
  - {Blank}

• Reaction Type
  - Allergy
  - Contraindication
  - Intolerance
  - Unspecified
  - {Blank}

• Severity
  - High
  - Medium
  - Low
  - {Blank}

• Open Text Comments
  - Common Comments
    - Notes about previously tolerating cephalosporin/penicillin – either patient reported or in patient exposure
    - Notes about when the reaction occurred (e.g. as a child, in 1958, etc.)
    - Family history
**Objective 1**
Evaluate the number of pts who may be appropriate for inclusion in a PST protocol using comprehensive eMR review.
Give Cephalosporin
76 patients
1/12/2019

76 patients
Give Cephalosporin

652 pts
- 76 Give Ceph
576 remaining

Has pt *previously tolerated* a cephalosporin and/or PCN within eMR?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IgE Mediated</strong></td>
<td>100 pts</td>
<td>183 pts</td>
</tr>
<tr>
<td></td>
<td>(35%)</td>
<td>(65%)</td>
</tr>
<tr>
<td><strong>Non-IgE Mediated</strong></td>
<td>59 pts</td>
<td>68 pts</td>
</tr>
<tr>
<td></td>
<td>(46%)</td>
<td>(54%)</td>
</tr>
<tr>
<td><strong>Unknown</strong></td>
<td>83 pts</td>
<td>83 pts</td>
</tr>
<tr>
<td></td>
<td>(50%)</td>
<td>(50%)</td>
</tr>
</tbody>
</table>

Give Cephalosporin 242 pts

Give Cephalosporin
1/12/2019

652 pts
- 76 Give Ceph
- 242 Give Ceph
- 183 PST
151 remaining

### Previously Tolerated Cephalosporin and/or Penicillin?

- **Yes**
  - 242 patients
  - Give Cephalosporin

- **No**
  - Reaction Type?
    - IgE Mediated
    - Non-IgE Mediated
    - Unknown

### Reaction Severity?

- Unknown
- High
- Medium
- Low

#### PST

#### Give Cephalosporin

### Reaction Type?

- IgE Mediated
- Non-IgE Mediated
- Unknown

### Reaction Severity?

- Unknown
- High
- Medium
- Low

#### PST

#### Give Cephalosporin

### Table Summary

<table>
<thead>
<tr>
<th></th>
<th>Unknown</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-IgE Mediated</strong></td>
<td>2 pts</td>
<td>8 pts</td>
<td>6 pts</td>
<td>52 pts</td>
</tr>
<tr>
<td><strong>Unknown</strong></td>
<td>76 pts</td>
<td>2 pts</td>
<td>3 pts</td>
<td>2 pts</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>PST 88 pts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### PST

#### Give Cephalosporin

63 pts
652 pts
- 76 Give Ceph
- 242 Give Ceph
- 183 PST
- 88 PST
- 63 Give Ceph
0 remaining

Evaluation From Full eMR Review
Of 652 Patients:
- 381 Give Cephalosporin
- 271 PST

41.6% (n=271) of pts evaluated by full eMR review met inclusion criteria for PST.
Objective 2
Evaluate the utility of the current eMR allergy documentation when *used alone* vs full eMR review to identify potential candidates for PST.
32.1% (n=126) of the pts identified as candidates for PST using allergy record alone had no reaction, reaction severity or comments to assess allergy.

### Results

<table>
<thead>
<tr>
<th>Evaluation Utilizing Allergy Record Alone vs Evaluation From Full eMR Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>60.1% (n=392) meet inclusion criteria for PST.</td>
</tr>
<tr>
<td>41.6% (n=271) meet inclusion criteria for PST.</td>
</tr>
</tbody>
</table>

### Conclusions

- Utility of the eMR allergy record to identify potential candidates for PST:
  - Does not appear to facilitate quick and/or accurate assessment of pts appropriateness for PST
  - Significant number of pts with allergies documented without an associated reaction or reaction severity

- Further optimization of the eMR’s allergy documentation is needed

- Recommendations for optimization:
  - Require “hard stops” for allergy reaction
  - Link reaction to associated severity and classification
  - Provide instructions within the record for obtaining comprehensive allergy history and definitions of reactions
  - Include options for previously tolerated beta-lactams


Questions?

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