Retrospective Review of Alternative Antibiotic Use in Patients with a Reported Penicillin Allergy at a Community Hospital

Rita Chamoun  
*Baptist Hospital of Miami*, RitaCh@baptisthealth.net

Monica Tadros  
*Baptist Hospital of Miami*, MonicaT@baptisthealth.net

Amy Montes  
*Baptist Hospital of Miami*, AmyMon@baptisthealth.net

Heidi Clarke  
*Baptist Hospital of Miami*, heidic@baptisthealth.net

Radhan Gopalani  
*Baptist Hospital of Miami*, radhang@baptisthealth.net

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Retrospective review of alternative antibiotic use in patients with a reported penicillin allergy at a community hospital

Rita Chamoun, Pharm.D., Monica Tadros, Pharm.D., Amy Montes, Pharm.D., BCPs, Heidi Clarke, Pharm.D., BCCCP, Radhan Gopalan, Pharm.D, BCPs
Baptist Hospital of Miami, Department of Pharmacy; Miami, FL

BACKGROUND

• Penicillin (PCN) is the most commonly reported beta-lactam (BL) allergy; prevalence among hospitalized patients is ~10%–20%1
• Less than 10% of these patients are truly allergic, but common side effects of BLS (i.e. fever, nausea, vomiting, diarrhea) are often mistaken for allergic reactions and inaccurately documented as an allergy in the electronic health record (EHR).1,2
• A true PCN allergy may decrease over time; 50% of patients lose sensitivity after 5 years and 80% after 10 years3
• Patients with a reported PCN allergy are often treated with non-BL broad-spectrum antibiotics4,5, which may lead to suboptimal antibiotic therapy, more adverse events, development of multi-drug resistant infections, increased length of stay, ICU admissions, higher mortality and increased treatment costs.1,2
• Cross reactivity reported for 1st generation cephalosporins is ~ 1% and negligible for 2nd generation cephalosporins yet all cephalosporins are often avoided in patients with a reported PCN allergy2

OBJECTIVES

• Determine the incidence, clinical outcomes and costs associated with the use of alternative antibiotic treatment in patients with a reported PCN allergy
• Establish the foundation for a follow-up phase II study evaluating the impact of a pharmacy-driven PCN allergy assessment on allergy clarification and antibiotic selection

METHODS

• Study design: Single-center, retrospective chart review of patients admitted to Baptist Hospital of Miami with a reported PCN allergy between February 1, 2018 and August 1, 2018
• Inclusion criteria: Individuals ≥ 18 years old, reported PCN allergy, diagnosis of an infection for which a PCN or a BL antibiotic can be used, received antibiotics for at least one day during hospital stay
• Exclusion criteria: Patients receiving antistaminis (AH)-1st generation AH within 24 hours, or a 2nd generation AH within the 5 days prior to antibiotic administration, severe immunosuppression (i.e. HIV with CD4 count <200 cells/µL, neutropenia, malignancy, transplant patients taking immunosuppressive medications), anaphylactic allergy to PCN within the last 10 years, pregnant/breastfeeding, severe cardiovascular or pulmonary comorbidities
• Primary outcomes: Type of antibiotic(s) used, costs, adverse effects and allergy documentation
• Secondary outcomes: Length of stay, duration of therapy, resolution of infection and mortality
• Reported allergies were reviewed and categorized into one of two categories:
  • Defined: both an allergy to PCN and the associated reaction are documented on the EHR
  • Undefined: an allergy to PCN is documented on the EHR without an associated reaction

RESULTS

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aztreonam</td>
<td>$2,080.64</td>
</tr>
<tr>
<td>Tigecycline</td>
<td>$2,253.60</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>$2,134.20</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>$1,743.20</td>
</tr>
<tr>
<td>Ertapenem</td>
<td>$1,543.90</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>$1,409.36</td>
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<tr>
<td>Cefepime</td>
<td>$922.72</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>$680.70</td>
</tr>
<tr>
<td>Meropenem</td>
<td>$633.60</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>$264.48</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>$215.32</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>$18.00</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>$28.80</td>
</tr>
<tr>
<td>Cephalaxin</td>
<td>$16.56</td>
</tr>
</tbody>
</table>

Total Cost: $23,875.08

ANTIBIOTIC SELECTION PER INFECTION TYPE

Prescribing Trends by Specialty

<table>
<thead>
<tr>
<th>Prescriber</th>
<th>Aztreonam</th>
<th>Levofloxacin</th>
<th>Cephalosporins</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>10</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Hospitalist</td>
<td>5</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Critical care</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pulmonologist</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nephrologist</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Gastroenterologist</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

DISCUSSION

• Inaccurate allergy documentation may lead to unnecessary use of non-BL broad-spectrum antibiotics and higher treatment costs
• Accurate allergy documentation by healthcare providers (i.e. nurses, pharmacists) and thorough review of allergy documentation by prescribers can potentially minimize unnecessary antibiotic use and decrease overall treatment costs
• Prospective studies should be conducted to assess the impact of a pharmacy-driven PCN allergy assessment (detailed patient interview) in an attempt to clarify/define allergy history

LIMITATIONS

• Small sample size
• Difficult to draw conclusions based on comparative data between patients with defined and undefined allergies
• Unable to determine cost savings with use of alternative antibiotics
• Documentation in the EHR was not complete/thorough
• Information from outside of hospital stay not easily accessible
• Time frame defined allergies (i.e. anaphylaxis)
• Prior medication use (i.e. AHS)
• Resolution of infection for patients discharged on outpatient antibiotics

REFERENCES