Utilizing a Standardized Questionnaire to Investigate Antibiotic Allergies

Sarah M. Yi[1], Mary Barsanti-Sekhar[2], Amy W. Wozniak[3], Maressa Santarossa[4], Jenna Adams[5], Fritzie Albarillo[4]

1. *Stritch School of Medicine, Loyola University of Chicago, Maywood, Illinois*
2. *Department of Internal Medicine, Loyola University Medical Center, Maywood, Illinois*
3. *Center for Translational Research and Education, Loyola University Chicago Health Sciences Division, Maywood, Illinois*
4. *Division of Infectious Diseases, Loyola University Medical Center, Maywood, Illinois*
5. *Department of Pharmacy, Loyola University Medical Center, Maywood, Illinois*

Introduction

- Abrams et al. found a majority of patients to have a false antibiotic allergy label after allergy consultation.[1]
- Blumenthal et al. and Sousa-Pinto et al. demonstrated that incorrect labeling of antibiotics can result in suboptimal antibiotic treatment, increased risk of antibiotic resistance, and increased healthcare costs.[2,3]
- Recent initiatives aimed to de-label antibiotic allergies include medication reconciliation and patient interview.[4]
- Torda et al. successfully de-labeled over 20% of antibiotic allergies based on clinical history alone.[5]
- The study site's electronic medical record does have an allergy section for documentation, however lacks a documentation tab for adverse medication reactions. This results in non-immune mediated reactions to be listed in the allergy documentation.

Purpose

To investigate the prevalence of non-immune mediated reactions to antibiotics among patients with a documented antibiotic allergy by using a standardized questionnaire.

Methods

Subjects

Recruitment

- Adult patients with a history of antibiotic allergy were recruited from 2 clinics in the greater Chicagoland area

Questionnaire

- Participants completed a standardized questionnaire regarding the details of their previous adverse reactions to antibiotics

Questionnaire

Name	
Date of Birth	
Gender	❑ Male ❑ Female ❑ Other _____ ❑ Prefer not to disclose
Ethnicity	

1. Have you ever experienced an adverse reaction to an antibiotic before? (If you have experienced a reaction to more than one antibiotic, please fill out one form, questions 1-11, per antibiotic reaction)
❑ Yes
❑ No

2. Which antibiotic did you take? Please select only <u>one</u>.
❑ Penicillin
❑ Amoxicillin
❑ Azithromycin (ZPak)
❑ Amoxicillin/Clavulanate (Augmentin)
❑ Clindamycin
❑ Cephalexin (Keflex)
❑ Ciprofloxacin (Cipro)
❑ Sulfamethoxazole/Trimethoprim (Bactrim)
❑ Metronidazole
❑ Levofloxacin (Levaquin)
❑ Doxycycline
❑ Other: _____

3. Date of adverse reaction (approx. okay)
❑ Within the past year
❑ 1-5 years
❑ 5-10 years
❑ 10+ years
❑ Unknown

4. Why were you taking an antibiotic?
❑ Upper respiratory infection (throat infection)
❑ Lower respiratory infection (pneumonia, bronchitis)
❑ Ear infection (otitis media)
❑ Skin infection
❑ Urinary tract infection
❑ Other: _____

Figure 1. Questionnaire, questions 1-4

Methods

5. How were you taking the antibiotic?
❑ Oral (by mouth)
❑ Intravenous
❑ Topical
❑ Intramuscular

6. What was your reaction to the antibiotic? Please check all that apply.

❑ Nausea ❑ Vomiting ❑ Abdominal pain ❑ Constipation ❑ Diarrhea ❑ Blood in the stool ❑ Heartburn ❑ Difficulty Swallowing ❑ Black stools	❑ Rash ❑ Hives ❑ Itchy skin ❑ Skin ulcers ❑ Shortness of breath ❑ Asthma/wheezing ❑ Cough ❑ Spitting up blood	❑ Joint pain or stiffness ❑ Muscle pain ❑ Muscle spasms or cramps ❑ Swelling ❑ Facial swelling (angioedema) ❑ Fatigue ❑ Headache

❑ Other (please describe below):

7. How soon after starting the medication did the reaction happen?

Hours	Days	Weeks	Months

8. Were you hospitalized from the reaction?
❑ Yes
❑ No

9. What happened after you stopped taking the antibiotic?

Figure 2. Questionnaire, questions 5-9

10. Have you undergone skin prick testing and/or oral challenge to the antibiotic?
❑ No
❑ Yes
❑ Unsure

11. Please indicate which antibiotics you have taken <u>since</u> the time of the reaction (to the best of your memory)
❑ Penicillin
❑ Amoxicillin
❑ Azithromycin (ZPak)
❑ Amoxicillin/Clavulanate (Augmentin)
❑ Clindamycin
❑ Cephalexin (Keflex)
❑ Ciprofloxacin (Cipro)
❑ Sulfamethoxazole/Trimethoprim (Bactrim)
❑ Metronidazole
❑ Levofloxacin (Levaquin)
❑ Doxycycline
❑ Other: _____

Figure 3. Questionnaire, questions 10-11

Categorization

- Symptoms were categorized as non immune-mediated or immune-mediated reactions (hypersensitivity type I-IV reactions)
- Non-immune mediated: nausea, abdominal pain, vomiting, constipation, diarrhea, heartburn, cough, fatigue, joint pain or stiffness, fatigue
- Immune-mediated: rash, hives, itchy skin, skin ulcers, difficulty swallowing, swelling, facial swelling, (angioedema), shortness of breath, asthma/wheezing

Results

- 98 patients were recruited for this study with a total of 159 questionnaires completed.
- Penicillin was the most frequently listed allergy (Figure 4).

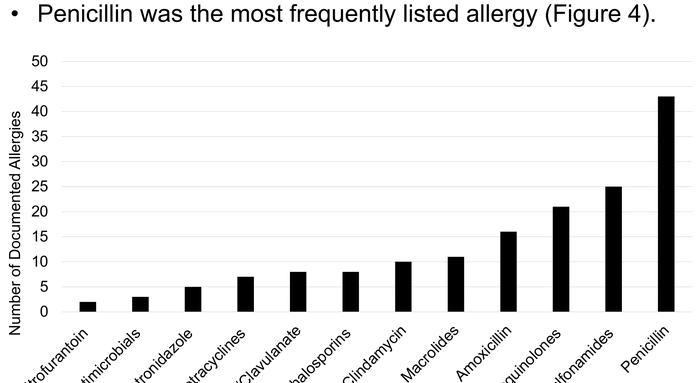

Figure 4. Relative number of antibiotic allergy questionnaires completed

- The most prevalent symptoms of adverse reaction were rash (47.2%), hives (39.1%), and itchy skin (33.5%).
- Out of a total of 161 questionnaires, 35 antibiotic labels (25.7%) were identified to be non-immune mediated.
- 18 patients (18.4%) were found to have no immune-mediated adverse reactions to antibiotics.

Results

- Macrolides (8/11, 40%) and nitrofurantoin (1/2, 50%) were the antibiotics most frequently found to have adverse reactions that were non-immune-mediated.
- Figure 5 provides the proportion of immune-mediated adverse reactions for each type of antibiotic studied.

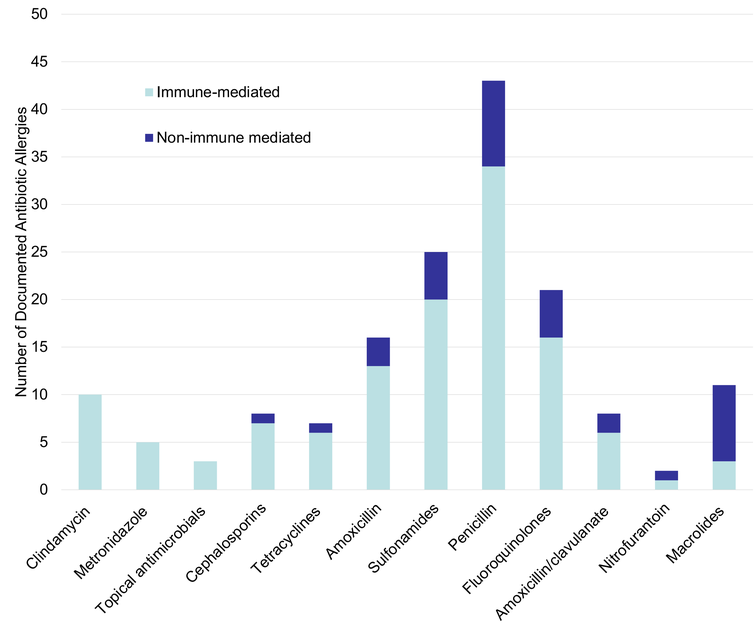

Figure 5. Proportion of Immune-Mediated Adverse Reactions by Antibiotic

Conclusions

This study demonstrates the feasibility of using a standardized questionnaire as a tool to discern immune-mediated reactions to antibiotics from those that were non-immune mediated. This tool may be used to improve the accuracy of antibiotic allergy documentation.

Acknowledgement

Research reported in this poster was supported by the National Institute of Allergy and Infectious Diseases (NIAID) of the National Institutes of Health under award number 5T35 AI125220-4

References

1. Abrams, et al. Allergy, Asthma Clin Immunol. 12(1):59, 2016.
2. Blumenthal, et al. BMJ. 361:k2400, 2018.
3. Sousa-Pinto, et al. Ann Allergy Asthma Immunol. 120(2):190-194.e2, 2018.
4. Devchand, et al. J Allergy Clin Immunol Pract. 7(3):1063-1065, 2019
5. Torda, et al. The Intl Journal of Clin Pract. 72(3): e13058, 2018