Antimicrobial Stewardship Assessment in De-labeling Beta-lactam Allergies

Keck Medical Center of USC

Nicole Fahmy, PharmD[1]; Faiza Morado, PharmD[1]; Neha Nanda, MD, FSHEA[1,2]

[1]Keck Medical Center of University of Southern California; [2]Keck School of Medicine of University of Southern California

Keck School of Medicine of USC

INTRODUCTION

- While 10% of the US population may have a beta-lactam allergy (BLA) label, only about 1% will have a true IgE-mediated hypersensitivity reaction
- Self-reported, inaccurate allergy labels result in an increase in drug-resistance and healthcare associated infections (ie. Clostridioides difficile infection) as a result of alternative antibiotic use that is often unnecessarily broad and potentially less effective
- Therefore, allergy assessments to de-label patients not truly allergic is an important antimicrobial stewardship (AMS) tool

OBJECTIVE

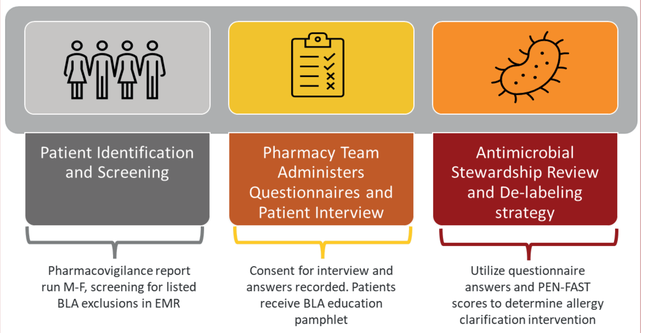
- Assess the effectiveness of a combined effort of an allergy focused pharmacy led questionnaire and antimicrobial stewardship rounds to improve the accuracy of BLA labels

METHODOLOGY

- Patients admitted from November 2021 to April 2022 with a BLA documented in the electronic medical record (EMR) were screened for study participation

Inclusion	Exclusion
• Age ≥ 18 years with a BLA documented in the EMR • Inpatient stay >2 days	• Intensive Care Units (ICUs), outpatient, or surgery units • Unable to participate and no reliable source for interview • Declines interview

- Eligible patients were interviewed by a pharmacy student, intern or resident utilizing a questionnaire that included elements to calculate a PENFAST score for those with a penicillin specific allergy
  - PEN-FAST is a penicillin allergy risk tool that allows for point of care risk assessment using three clinical criteria: timing of reaction, phenotype (anaphylaxis, angioedema), and systemic treatment for reaction
- AMS conducted BLA de-labeling rounds three times a week to review completed allergy questionnaires for potential deletion of the antibiotic allergy in the EMR



RESULTS

Figure 1. BLA Patient Screening

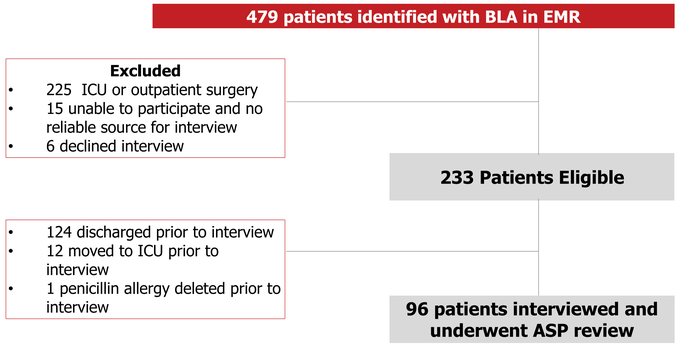


Table 1. Baseline Characteristics

Baseline Characteristics	
Sex, No. (%) [N=96]	
Female	52 (54.2)
Male	44 (45.8)
Median Age (years, range)	64 (22 – 88)
Beta-Lactam allergy label, No. (%) [N=116]	
Penicillins	91 (78.4)
Cephalosporin	22 (18.9)
Carbapenem	2 (1.7)
Monobactam	1 (0.8)
Reaction type in EMR, No. (%) [N=116]	
Anaphylaxis	4 (3.4)
Rash or pruritus	45 (38.8)
Urticaria	14 (12.1)
Swelling	8 (6.9)
Difficulty breathing	5 (4.3)
Diarrhea	7 (6.0)
Unknown	38 (32.8)

Table 2. BLA Patient Responses to Questionnaire

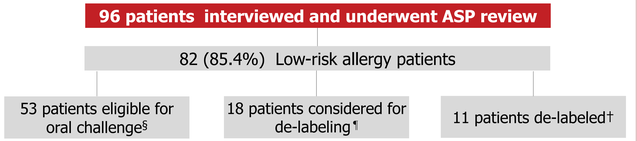
Questionnaire Prompt	No. (%) [N = 96]
Patients recalling a severe reaction to beta-lactam drug	55 (57.3)
Anaphylaxis	34 (35.4)
Cardiovascular	8 (8.3)
Neurologic	9 (9.4)
Urologic	2 (2.1)
Patients reporting allergic reaction occurred > 10 years	71 (73.9)
Symptomatic < 7 days following initial reaction	59 (61.5)
Patients hospitalized for initial reaction	10 (10.4)
Patients requiring treatment for initial reaction	8 (8.3)

Table 3. Duration of Therapy for non-Beta-lactam Antibiotics

Drug Category	Drug Name	Total Days of Therapy (DOT)
Anti-MRSA	Vancomycin (IV)	80
	Linezolid (IV)	3
	Clindamycin (IV)	48
Fluoroquinolone	Ciprofloxacin (IV)	55
	Levofloxacin (IV)	12
Potential DOT Saved of Anti-MRSA and Fluoroquinolone Agents		198

RESULTS

Figure 2. BLA Patients with Low-risk Allergy Outcomes



Note:
- 11 patients deemed high-risk which included PMH of Mast Cell Syndrome and anaphylactic reaction to penicillin from patient description
- 3 patients had no changes made to allergy profile as more information was needed

§Patient eligibility for oral challenge was based on a combination of resulting PEN-FAST score and EMR search of no previous BL exposure

† Patients were considered for de-labeling if they had documented receipt of a BL agent with similar side chain to reported allergy and consented to allergy removal

¶ De-labeling was not completed due to inability to obtain patient consent for allergy removal

Table 4. PEN-FAST Score Correlation to Allergy Outcomes

Primary Outcomes	Average PEN-FAST Score (SD)
Patients eligible for oral challenge (n=53)	1.08 (1.2)
Patients de-labeled from allergy (n=18)	0.5 (0.9)
Patients not candidates for allergy de-labeling (n=11)	2.4 (1.3)

DISCUSSION

- This study confirms detailed histories can identify mislabeled BLA
- While only 11 patients were de-labeled, an additional 18 patients would have had their allergies deleted from the EMR pending patient consent for removal
- 53 low-risk allergy patients had the potential to be de-labeled pending an oral challenge
- Limitations include:
  - Limited follow-up (ie. beta-lactam tolerability following de-labeling)
  - Pilot study which did not include oral challenges (planned for next phase)
- Next Steps:
  - Include patient consent for allergy de-labeling at time of interview
  - Develop standardized protocol for oral challenges in low-risk allergy patients

CONCLUSIONS

- AMS BLA assessments can decrease the prevalence of false BLA labels and prescribing of unnecessary broad-spectrum agents
- PEN-FAST scores less than 2 suggests that allergy assessments may help identify patients with low-risk penicillin allergies

REFERENCES

1. Staicu ML, Vyles D, Shenoy ES, et al. Penicillin Allergy Delabeling: A Multidisciplinary Opportunity. *J Allergy Clin Immunol Pract.* Oct 2020;8(9):2858-2868.e16. doi:10.1016/j.jaip.2020.04.059
2. Trubiano J, Phillips E. Antimicrobial stewardship's new weapon? A review of antibiotic allergy and pathways to 'de-labeling'. *Current opinion in infectious diseases.* 2013

Disclosure: No financial support was received and no personal connections that serve as potential conflicts of interest for all researchers.