De-labelling self-reported penicillin allergy within the emergency department (ED) through the use of skin tests and oral drug provocation testing.

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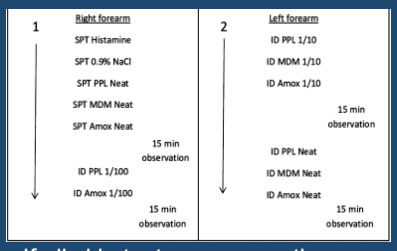
Introduction

Self reported penicillin allergy is common among patients attending ED. It is a poor predictor of true penicillin allergy. A label of penicillin allergy is associated with issues relating to antibiotic stewardship, increased costs of treatment and poorer clinical outcomes. This study hypothesized that using a combination of skin testing and oral challenge that the majority of patients with self-labelled penicillin allergy could be de-labelled.

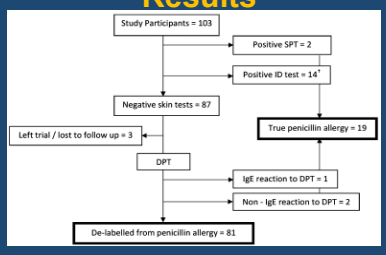
Methods

A prospective study of penicillin allergy testing at an urban, academic ED using standardised criteria was performed between 2011-2016. The study was Ehics approved (HREC09/ SVH/149) and subjects gave informed consent. Patients aged 18-85yrs were included, exclusions were a clear history of severe anaphylaxis, pregnancy, unable to consent, unstable illness, medications (beta blockers, corticosteroids, antihistamines, cromolyns). The majority of subjects were recalled for testing in batches. Diater kits (AMSL) provided the reagents for SPT and ID testing. Reagents included: major determinant mix PPL (benzylpenicilloyll polylysine), minoi determinant mix MDM (sodium benzyl penicillin, benzylpenicilloic acid, sodium benzylpenicillosoate) and amoxycillin 20mg/ml. The following protocol was used.



If all skin tests were negative a graded Amoxil challenge was given: 2.5 to 250mg over 9 days. The first dose was given under supervision.

Results



Flow through study. DPT: drug provocation testing; ID: intradermal tests; SPT: skin prick test

TABLE 1. *Demographic, triage and discharge characteristics*

Characteristic	
All enrolled subjects	N = 103
Women, n (%)	56 (54)
Median (interquartile range) age (years)	43 (30–55); min = 19, max = 69
Subjects with outcome data	N = 100
Women, n (%)	54 (54)
Median (interquartile range) age (years)	42.5 (30–54.5); min = 19, max = 69
Antibiotics prescribed	N = 100
Yes	30
No	70
Discharge destination	N = 100
Home	65
Ward	10
Emergency Medical Unit †	25

Australasian Triage Scale	Study patients	ED profile 2011–2016[21]	
	N = 100	N = 253 982	N = 100%
Category 1 – Immediate	0	6183	2.4
Category 2 – Emergency	16	30 956	12.2
Category 3 – Urgent	41	118 754	46.8
Category 4 – Semi-urgent	25	86 363	34.0
Category 5 – Non-urgent	18	11 726	4.6

†For emergency medicine admissions <24 h duration.

TABLE 2. *Prevalence of true penicillin allergy and associations between age and sex (logistic regression model)*

Grouping	n/N with true allergy	True prevalence (95% confidence interval)	Odds ratio (95% confidence interval)	P-value
All subjects	19/100 (19%)	19 (11.8–28.1)%		
Sex				
Male	4/46 (8.7%)	8.7 (0.9–20.8)%	1.0 (reference)	0.02
Female	15/54 (27.8%)	27.8 (16.5–41.6)%	4.0 (1.23–13.2)	
Age group (years)				
≤30	7/28 (25.0%)	25.0 (10.7–44.9)%	1.0 (reference)	0.44
31–43	2/24 (8.3%)	4.2 (0.1–26.9)%	0.27 (0.05–1.47)	
44–55	5/24 (20.8%)	20.8 (7.1–42.2)%	0.79 (0.21–2.91)	
≥56	5/24 (20.8%)	20.8 (7.1–42.2)%	0.79 (0.21–2.91)	

TABLE 3. *Reported reactions during drug provocation testing*

Reported reactions during drug provocation testing	De-labelled	N = 6
Urticarial rash and tingling lips†	No	1
Delayed rash	No	2
Pruritus	Yes	1
Diarrhoea	Yes	1
Nausea	Yes	1

†Likely IgE mediated.

Discussion

This study demonstrated a significant reduction in apparent prevalence of penicillin allergy with 81% of the tested subjects able to safely tolerate an oral challenge of 250mg of Amoxil

A total of 17 patients had evidence of IgE hypersensitivity and 2 developed a delayed rash probably due to non-IgE mechanisms. Of the 84 subjects who had negative skin testing only 3 reacted during the Amoxil challenge.

Women were more likely to have a true penicillin allergy (OR 4.0), this has previously been shown in other studies.

The whole testing process took 2 hrs in ED and 9 days of self medication; it seems likely that the process could be shortened at both steps

Although achievable in an ED setting a dedicated team is required to facilitate the process of subject identification and testing. Although not assessed in this study the change in allergy status of the subject needs to be firmly reinforced.

The process of delabelling is important to facilitate better patient outcomes, reduced costs to the health care system and reduced antibiotic resistance ad should be more widely accessible. ED testing successfully provides a way to achieve this.

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References:

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