



Letters

Penicillin allergy labeling on medical alert jewelry

Penicillin allergy is self-reported by 9.4% of adults in South Australia and is reflected in up to 20% of hospital medical records.¹ Drug allergy status can be communicated through medical information jewelry, and we reported that allergy to penicillins was declared on 16.6% of MedicAlerts in Australia.²

It has been estimated that 90% to 99% of people with a penicillin allergy label are not allergic to penicillin.³ Penicillin allergy labels influence prescribing and are associated with multiple adverse outcomes.⁴

We surveyed a subset of MedicAlert subscribers with declared penicillin allergy, seeking to identify characteristics of the allergic reaction, risk stratification, suitability for further investigation, and barriers to allergy testing and delabeling.

Data were extracted from the MedicAlert database as per Le et al² to identify subscribers with only the generic term “penicillin” to describe their drug allergy on their jewelry. Of these subscribers, 700 were randomly selected (using Excel 2013, Microsoft Corporation, Redmond, Washington) to receive an online questionnaire through email from the MedicAlert Foundation (Appendix 1). Ethics approval was obtained (Royal Adelaide Hospital Human Research Ethics Committee approval no. HREC/17/RAH/51), and all participants provided informed consent.

Information collected included the following: (1) implicated antibiotic, (2) reaction description, (3) antibiotics tolerated, (4) allergy testing since the reaction, and (5) willingness to undergo allergy testing and delabeling. A recently described beta-lactam antibiotic assessment tool⁵ was used to stratify the severity of reported reaction and appropriateness for delabeling.

Of 61,542 MedicAlerts, 9227 were used to declare allergy to penicillin. The 8112 subscribers who used only the generic term “penicillin” to describe their drug allergy had a mean age of 59.1 (SD 20.7) years; 27% of these subscribers were men (2258/8112). Survey response rate was 18.7% (131/700). The mean age of respondents was 61.1 (SD 16.4) years, and 20.6% (n = 27) were men. The age of respondents and the number of men were not statistically significantly different from those of all the subscribers with “penicillin” on their jewelry (*t* test and χ^2 statistics, respectively, $P < .05$). The index penicillin was unknown in the majority (82%, n = 108), with the remaining subscribers reporting amoxicillin (9%, n = 12) and, unexpectedly, cephalosporins (1.5%, n = 2) as the responsible agents. Most index reactions were remote, occurring at an average of 31.7 (SD 19.2) years ago. Figure 1 depicts the

categorization of reaction history by severity and suitability for further testing.

Tolerance to either cephalexin, cefaclor or both was reported in 35.1% (n = 46) and was not related to the severity of reaction history. Other antibiotics commonly taken were roxithromycin (n = 11), erythromycin (n = 7), or doxycycline (n = 6). Surprisingly, 16.8% (n = 22) reported tolerance to amoxicillin, negating the penicillin allergy label (Fig 1). For wording on the MedicAlert jewelry, respondents relied on the following: (1) general practitioner (60%, n = 79), (2) self or family member (24%, n = 32), (3) specialist (8%, n = 10), or (4) MedicAlert staff (5%, n = 6).

Previous penicillin allergy testing was reported by 14.5% (n = 19) of respondents, either through a blood test (n = 4), skin test (n = 14), or challenge (n = 1). In the remaining 112 respondents, only 68 (60.7%) would have allergy testing if recommended; 24 (24.4%) would refuse to have allergy testing or make a change to their jewelry if found not allergic, and 2 did not answer either question. Reasons for declining allergy testing were predominantly fear or family history of penicillin allergy. Specific statements included the following: (1) “too scared to try,” (2) “there is a strong family history,” and (3) “I have systemic mastocytosis and I have severe reactions to many things including medications.”

This survey targeted people with self-declared penicillin allergy who regarded it as sufficiently important to engrave onto MedicAlert jewelry (ie, those who are literally labeled). Most respondents reported a potentially severe reaction history (60.3%) (Fig 1), which was statistically significantly higher than the proportion with a severe reaction history, assessed using the same method, in an electronic health record survey (22.3%; $P < .001$).¹

However, a substantial proportion of incident reactions were remote or mild and potentially suitable for allergy testing. Those with reaction histories of intolerance, isolated rash, or unknown history more than 10 years ago are a group in which low-cost interventions could be made with either direct delabeling (3%) or oral provocation testing (23.7%) in the presence of medical supervision. A further 52.7% would be appropriate for consideration of skin testing, then direct oral provocation. Direct delabeling could also apply to 16.8% if the history of tolerance to amoxicillin was confirmed (Fig 1).

Only one-third of the respondents had been prescribed a cephalosporin since the incident reaction. Although cross-reactivity between penicillins and cephalosporins exists, it is uncommon and often related to the side chain rather than the beta-lactam ring.⁶ Therefore, knowledge of the specific penicillin to which a person reacted is advantageous, although this was seldom recorded. In our surveyed group, the most commonly prescribed alternatives after cephalexin were macrolides or tetracyclines. These second-line agents are associated with higher rates of treatment failure, antibiotic resistance, and *Clostridium difficile* infection.³

Disclosures: Dr Foreman is employed by the MedicAlert Foundation of Australia as a clinical advisor. Dr Smith is an honorary (nonfinancial) member of the Medical Advisory Board of the MedicAlert Foundation of Australia. The remaining authors have no conflicts of interest to report.

Funding: The authors have no funding sources to report.

<https://doi.org/10.1016/j.anai.2020.03.002>

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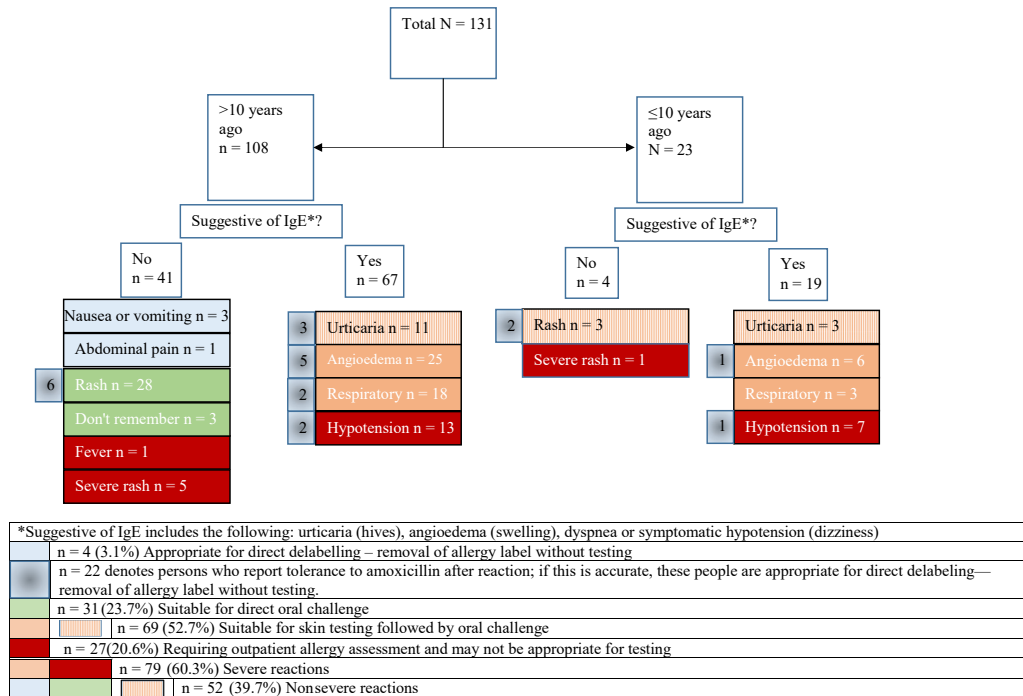


Figure 1. Categorization of penicillin reaction history by severity and suitability for further testing. IgE, immunoglobulin E.

A substantial number (albeit a minority) would refuse testing or updating their MedicAlert jewelry to reflect tolerance of penicillin. It is possible that those who elect to wear MedicAlert jewelry are more likely to be “invested” in their penicillin allergy and less likely to accept delabeling than the general population.

A detailed history when ordering a MedicAlert could identify those who might benefit from further evaluation. Specifying penicillin type on the jewelry or database is useful given the poor patient recall of the index drug. The majority reported high-risk features consistent with anaphylaxis or severe cutaneous reaction, confirming that medical alert jewelry notifications must be taken seriously. Nevertheless, more than three-quarters of respondents would be appropriate for consideration for skin testing, drug challenge, and potential delabeling. Most people surveyed would be interested in allergy testing if recommended, but fear of reaction was a common concern in those who were hesitant.

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Supplementary Data

Supplementary data associated with this article can be found in the online version at <https://doi.org/10.1016/j.anai.2020.03.002>.

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Appendix 1. Survey of persons with MedicAlert Jewelry stating “penicillin” allergy

1. What is your MedicAlert membership number?	
2. How often do you wear your MedicAlert ID	
	☐ always
	☐ never
	☐ sometimes
3. Do you know what type of penicillin you reacted to?	
	☐ yes
	☐ No - I was told I was allergic to "penicillin" - that's all I know
4. Please enter the name of the penicillin you reacted to?	
5. a) What age was the reaction?	
5. b) When was the reaction year?	
5. c) The number of years ago was:	
6. Which features describe your reaction? Please check one or more answers	
	☐ rash
	☐ Swelling (face/lips/tongue/throat/hands)
	☐ shortness of breath
	☐ Dizziness, low blood pressure or collapse
	☐ Nausea, vomiting or diarrhoea
	☐ Other (please describe)
7. If you had a rash, pick the best description of the rash and associated features	
	☐ Hives
	☐ Severe rash with blistering/peeling or mouth/genital ulcers
	☐ other
8. Did you require medical treatment for the reaction?	
	☐ yes
	☐ no
	☐ don't know
9. If yes what treatment?	
	☐ Antihistamine
	☐ Cortisone (corticosteroid)
	☐ Hospitalisation/taken to hospital
	☐ treatment not sure
	☐ please comment

10. Where did you get advice about wording on your MedicAlert?	
☐	GP
☐	Specialist
☐	other health care worker
☐	family member
☐	self
☐	medic alert staff
11. Since the reaction have you had any of the following? (please select all that apply)	
☐	Amoxicillin/Amoxyl/Augmentin
☐	Flucloxacillin/Diclocaxillin
☐	Keflex/Cephalexin
☐	Cefaclor/Ceclor
☐	Ceftriaxone
☐	None of the above
☐	Don't know
12. Which other antibiotics have you used? Please write names	
13. Have you ever had penicillin allergy testing?	
☐	Yes
☐	No
14. If yes Please describe what penicillin allergy testing you had?	
☐	skin test
☐	blood test
☐	other (please specify)
15. If yes what was the result of the test?	
16. Would you be interested in penicillin allergy testing?	
17. Would you change the engraving on the MedicAlert ID if the test showed that you are no longer allergic?	
Please comment:	