PROCEDURAL ARTICLE

The occasional penicillin allergy test

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While penicillin allergy most definitely exists, its prevalence among all those labelled with penicillin allergy is under 10% and decreases with time after the last reaction.[1] A direct result of this overdiagnosis of 'penicillin allergy' is that more effective, cheaper and safer therapies are denied to many of our patients who do not actually have a penicillin allergy.[2,3] Better antibiotic stewardship will require clarification to prove or disprove whether a patient has a penicillin allergy.

HOW TO TEST YOUR PATIENTS FOR THE PREVALENCE OF PENICILLIN ALLERGY

Equipment needed

Emergency Supplies [Figure 1]:

- Epinephrine 1:1000
- Lookup table for epinephrine dose by age
- Diphenhydramine for injection
- Syringes and needles for resuscitation.

Testing Supplies:

- PRE-PEN® reagent (benzylpenicilloyl polylysine 6 × 10-5 M)
- Positive control: Histamine 6 mg/ml
- Negative control: 50% w/v glycerine in water
- Amoxicillin liquid and tablets
- Duo sharp plastic needles.

PATIENTS

- The author actively recruits patients based on the presence of the penicillin allergy label in the chart and the number of antibiotic prescriptions in their chart
- Due to reagent cost and stability, batch multiple patients within the day and use plastic skin test needles to minimise consumption of reagent
- Pre-visit instructions [Table 1] are given to the patient several weeks before the test is conducted
- Take a history – it does not need to be long: obtain details of the reaction, its timing post dose, how long ago the reaction occurred, what treatment was given and what other antibiotics the patient has tolerated
- Potential exclusions for testing are listed in Table 2 and are rare

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- A specialist opinion may be warranted in these cases. However, the most common reason for exclusion in my clinic is that people had forgotten the pre-visit instructions, and had taken an antihistamine within the prior week [Table 1].

THE SKIN PRICK TEST

1. An initial screen is done with skin scratch testing with emergency supplies at hand [Figure 1]. Scratch tests are considered very safe with rare systemic reactions (3:10,000 patients)[4]
2. *In vivo* penicillin gets converted to benzylpenicilloyl polylysine which is the major antigenic determinant in penicillin-allergic patients.[5] It is available in a dilute solution for skin testing
3. Low-risk reactions as screened by history such as a childhood exanthem, or an unknown reaction over 10 years ago, can proceed directly to oral challenge.[6] Nonetheless, for maximal safety, always do a skin prick test first
4. For the skin prick test, label the volar aspect of the forearm with P, – and + about 3 cm apart. Those will be the sites for each of benzylpenicilloyl polylysine (PRE-PEN®), 50% glycerine for negative control and histamine for positive controls
5. The author uses Duo sharp 2 needles. Dip them into the well of the reagent. Lightly dent the skin and rotate to administer each reagent
6. Read the diameter of the welt (not the flare). It is considered positive if it is 5 mm or larger induration after 15 min.[4] Figure 2 (negative test) shows a 10 mm response to histamine (+) with negative (–) and PRE-PEN® (P) reactions under 5 mm. This is a normal reaction that is interpreted as immune competent and benzylpenicilloyl non-allergic
7. Do not test positive individuals further as they have a >50% chance of reacting (potentially seriously) to oral penicillins.[4] Adults who test negative with PRE-PEN® have <5% chance of reacting to therapeutic penicillin.[4] Further testing to identify this subset is done by challenging them with an oral penicillin while under direct observation. The author gives a therapeutic dose

Table 1: Pre-visit patient instructions

Pre-visit instructions
Wear short sleeves
Do not take any antihistamines for a week before the appointment
You can take a steroid nasal spray
Allow 2 h for the testing
You can bring a book or your phone

Table 2: Contraindications for penicillin testing

Exclusion	Reason
Anaphylaxis in the previous month	Anaphylaxis suppresses skin tests
Serum sickness (type III reaction)	Skin tests are for type I reactions
Toxic blistering dermatological reactions	Allergies mediated by other means cannot be safely excluded and may be provoked with the oral challenge
Haematological renal or hepatic reaction	

Figure 1: Emergency supplies.

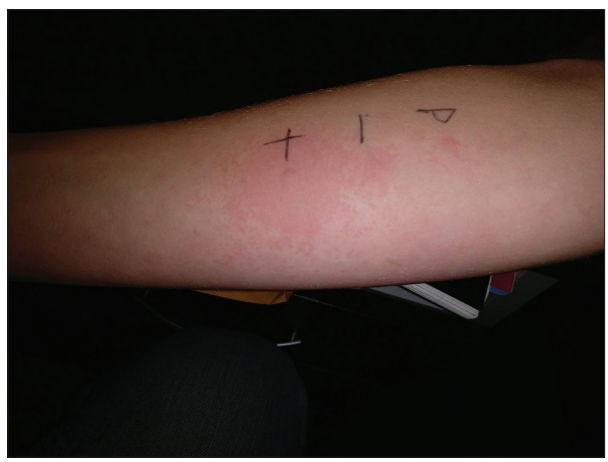

Figure 2: Results of a skin prick test. Negative test shows a 10 mm response to histamine (+), with negative (–) and PRE-PEN® (P) reactions under 5 mm.

Table 3: Post-visit instructions
Phone the clinic on XXX-XXX-XXXX if you have any late reactions or proceed to the ED
If tested negative, inform your pharmacy, hospital and doctors that you are no longer allergic to penicillin and that they should adjust your chart accordingly

of amoxicillin (500 mg for adults, weight-based dosing for children) which allows for testing of both minor and major antigenic components. Assess patients for another hour

8. The vast majority of our patients have no reaction to the oral challenge. Patients who pass are advised that they are not allergic to penicillin [Table 3]. Notes are sent to partners in the circle of care (including the pharmacy) to have them remove the penicillin allergy label from their systems.

In conclusion, penicillin allergy testing is easy to do and interpret. Most patients are 'de-labelled' as allergic, which is gratifying to both the physician and the patient.

CANADIAN SUPPLIERS

Alk-Abelló is the distributor of PRE-PEN® (benzylpenicilloyl polylysine injection USP).

Negative and positive controls and plastic skin test needles can be obtained from an allergy supply company such as Quantum Allergy Newmarket or Western Allergy Victoria.

Adrenalin 1:1000, diphenhydramine and amoxicillin are available from your pharmacy.

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