GUIDELINE FOR PAEDIATRIC ALLERGY SKIN PRICK TESTING

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Key Amendments

Date	Amendment	Approved by
October 2020	Document amended and reapproved	Paediatric QIM
26th March 2021	Approved with no amendments	Paediatric Guideline Review Day Meeting
20th March 2024	Clarity of patients covered – paediatric patients only	Paediatric Quality Improvement meeting and Medicines Safety Committee

INTRODUCTION

This guideline will focus on skin prick testing to aid the diagnosis of IgE-mediated allergy.

Allergy is a growing problem within the United Kingdom. The prevalence of food allergy in a large UK cohort studied varied between 2.3% and 5.3%, in children between 1 and 18 years (Venkatarama & Erlewyn-Lajeuness et al. 2017). The National Institute of Clinical Excellence (NICE 2011) and the British Society for Allergy and Clinical Immunology (El-Shanawany 2005) identify the importance of correct allergy management, in a range of disease processes including respiratory medicine, ENT and dermatology (House of Lords, 2007). Identification of an individual's allergy profile is of primary importance in the management of allergic disease. Skin prick testing can be used to look for allergen specific mast cell based IgE (Heinzerling et al 2013). Small amounts of allergen are introduced in to the epidermis and non-vascular superficial dermis. These interact with specific IgE bound to cutaneous mast cells. Histamine and other mediators are released, leading to a visible wheal. This allows for a range of allergens to be tested for and provides a result within 15 minutes.

Skin prick testing was initially developed in the early 1900's. Despite this, the test is still highly relevant today with its value being recognised in many national policies including the BTS/SIGN Guidelines on the Management of Asthma (2019) and the BSACI guidelines for the management of allergic and non-allergic rhinitis (Scadding 2017).

Skin prick testing has been shown to be safe, (Codreanu et al, 2006; Duce and Gouldstone, 2006). They are reliable providing they are interpreted within the context of a comprehensive

allergy history taken from the individual patient. This guideline does not cover allergy management.

Skin prick testing is not routinely indicated in the investigation of:

- Nonspecific rash without allergic/atopic characteristics;
- Chronic urticaria in the absence of allergic features on history;
- Food intolerance without allergic features (e.g. irritable bowel syndrome);
- Assessment of the effectiveness of allergen immunotherapy;
- Chronic fatigue without allergic features;
- Reactions to respiratory irritants (smoke, fumes, perfumes etc.)
  (Australasian Society of Clinical Immunology and Allergy 2016)

SPECIFIC IgE BLOOD TESTS

Specific IgE to an allergen is useful when Skin prick testing is unavailable, the patient has widespread eczema or the patient has taken antihistamine. It is important to note that false positives are common in children with a high total IgE.
Component testing in certain foods i.e. peanut and egg are also available but these should be discussed with a consultant who practices regularly in allergy diagnosis and management.

COMPETENCIES REQUIRED

This test may only be performed by competency assessed healthcare professionals who regularly work alongside a Paediatric Consultant and Paediatric Allergy Specialist Nurse who is actively involved in allergy management. This will include Registered Nurses and Health Care Assistants who work in the Paediatric Departments.

PATIENTS COVERED

Paediatric Patients attending Worcestershire Acute Hospitals NHS Trust for investigations of allergic disease within the Paediatric specialities.

DETAILS OF GUIDELINE

Supply and storage of allergens and control solutions for skin prick testing:

- Allergen solutions will be obtained via pharmacy in accordance with the Trust medicines policy.

- They must be stored at an appropriate temperature (2-8°), in a designated medicines fridge.
- When in use, solutions may be left out of the fridge for the duration of the clinic
- As with all other medical products, staff must check each product's expiry date prior to their use (some manufacturer's state that skin test solutions should be used within 6 months of opening).

Environment:

- Though skin prick testing is considered to be a safe procedure; there is a theoretical risk of a systemic allergic reaction to skin prick testing to food allergens. All skin prick test procedures must therefore be undertaken where there is immediate access to emergency equipment and medicines (NICE 2011).

Allergy history:

- Skin prick tests cannot be read in isolation and it is important that the results are interpreted in the light of the individual history.
- Before skin prick testing can be undertaken, the patient's allergy history should be recorded by either a medical practitioner or by a nurse who has completed a relevant allergy course or training.
- Responsibility for interpreting the results lies with the practitioner requesting the test. Staff must be aware that a positive result does not necessarily indicate a confirmed allergy and must not interpret the results or recommend allergen avoidance strategies to patients under these circumstances.

Selection of allergens for testing:

- Allergens must be selected on the basis of the person's allergy history. Random selection of allergens can result in inaccurate results that will complicate rather than clarify the patient's allergy profile.
- All skin prick tests must include positive and negative control solutions tests.
- Some allergens are identified by their Latin names, e.g. Dermataphagoides pteronyssinus (house dust mite) or interchangeable names (shrimp and prawn). Staff must be confident in the common names used in skin prick testing and must not use any product of which they are unsure.

- The skin prick test request form will act as the permanent record of the test and filed into the results section under paediatrics.

Equipment required:

- Selected allergens including positive and negative control
- Fresh food may also be used for testing
- Skin prick test request sheet
- Ball point pen
- Individual sterile skin prick testing lancets
- Sharps bin
- Tissues
- Skin test measure
- Timer/clock/watch
- Pillow (if required)
- Appropriate emergency equipment must be accessible
  (British Society for Allergy and Clinical Immunology 2021)

Preparation of the patient:

- The Trust policy for identification of the patient must be followed prior to the test.
- The staff member must check when the patient last had antihistamine medication. Long acting antihistamines such as cetirizine should be stopped a minimum 72 hours prior to testing. Short acting antihistamines, such as Piriton, can be stopped 48 hours prior to testing.
- Many patients who suffer with allergy related disease are on multiple medications and may not be aware of which of their medication is an antihistamine. If unsure, staff must check with a doctor or a senior nurse before starting the test. Other medication e.g. inhaled or topical steroids and leukotriene receptor antagonists should not be stopped.
- The patient must be free from an acute infection and observations taken if there is any parental or nursing concern. If the child is unwell, or parents report they are not well, then the skin prick test should be postponed.
- The staff member must explain the nature of the test, the anticipated effects (itching, redness and swelling at the test sites) and possible side effects (e.g. late local response) to the patient and obtain verbal consent.

- The preferred site for skin prick testing is the volar aspect of the forearm. This enables the tester to maintain eye contact with the patient. If required, a pillow can be placed under the patients forearm for comfort.
- Ensure the patient's arm is visibly clean. Skin prick testing should be performed on clear, eczema free skin where topical steroids and emollients have not be applied. Ask the patient to gently wash this area if the skin feels greasy.
- In young children or those with acute eczema the back or thigh may be a preferable site.

Procedure:

- The professional undertaking the test must wash their hands and use appropriate personal protective equipment.
- Use a ball point pen to mark the palmer aspect of the lower arm to indicate the allergen test sites. Numbers or letters may be used as long as the staff member is clearly able to identify the position of each allergen. Each allergen should be 2cm apart.
- Drop a small drop of each allergen onto the patient's skin, at the identified site.
- Prick the skin through each drop using an allergen lancet at 90°. The prick should be adequate to introduce the allergen to the dermal layers of the skin. It should not be sub-cutaneous nor should it be deep enough to draw blood.
- Use a fresh needle or lancet for each allergen and dispose in a sharps bin.
- Blot the allergen solutions from the skin using tissue paper, taking care not to contaminate one solution with another.
- Ensure the patient is comfortable and leave them to rest for 10 minutes. Ensure the nurse call system is available to them.
- After 10 minutes, read the results histamine result, check the patient is comfortable and leave them to rest for a further 5 minutes. After a total of 15 minutes, read the remaining results.
- The results should be read by measuring the longest extent of the wheal (not including any red flare) if the wheal is a regular circle. Or by measuring the longest extend of the wheal and the extent 90° to the first measurement, if the wheal is an irregular shape. Record the mean of these two measurements. Pseudopodia should be not be included in the measurement but noted with a 'P' on the request form.
- All measurements should be recorded in millimetres (mm).
- If there is no reaction, this should be reported as '0mm' as opposed to 'negative'.

Completion:

- Ensure the patient is comfortable.
- If the patient is suffering with itching at the skin prick test sites, running cold water over their arm and patting the area dry may help.
- If the itching is severe, consider using topical steroid cream. This is a medication and must be prescribed.
- Ensure that results are reported to the patient's consultant and that the skin prick test form is filed in the patients notes, under 'results'.

Interpretation of results:

- The results of the skin prick test must be interpreted by a doctor, or nurse trained in allergy, in light of the patient's history.
- A wheal diameter of at least 3mm larger than the negative control is accepted as a positive reaction in older children and young people. In younger children or babies and smaller wheal may be accepted as positive
- A wheal response to the negative control solution indicates either a testing error or the patient may have dermographism, or be sensitive to the stabilisers in the allergen solutions (which therefore invalidates the test). However, if the positive control is 3mm larger than the size of the negative control then the test can still be considered valid.
- A negative reaction to the positive control indicates that the child may have taken antihistamines or a high dose oral steroid, or has had some topical medication which prevents the skin from reacting and so invalidates the test.
- The person responsible for requesting the skin prick test should discuss allergen avoidance issues with the patient.
- Avoidance information must not be distributed to patients on the basis of the skin prick tests alone.
- Staff giving out information must be aware that all avoidance strategies require a degree of behaviour modification and some have a significant financial cost to the patient. They must therefore take responsibility for ensuring that they are up-to-date on current avoidance strategies.

Prick-to-Prick Testing.

This method of skin prick testing is required when the standardised allergen solution is not available (for example fruit and vegetables) or it is a physician's preference (for example the

validity of the solution is poor). Prick to Prick testing is particularly useful in aiding the diagnosis of Oral Allergy Syndrome (Scadding 2017). The food used for testing should always be fresh and not cooked or tinned.

This method uses exactly the same principles but the lancet is dipped or 'pushed' into the food first before the lancet is introduced onto the skin. In some cases it may be necessary to make a paste by adding water to the food.

GLOSSARY

IgE - Immunolglobulin group E – a type of antibody

Allergen- a substance, usually a protein, that causes an allergic reaction

Histamine – substance released by mast cells that causes the itchy rash

Psuedopodia – thin, arm-like projection of the histamine wheal

Dermographism - exaggerated wealing tendency when the skin is stroked

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Worcestershire Acute Hospitals NHS Trust
Assessment of competency for paediatric allergy skin prick testing

Performance Criteria	Description of Evidence Required	Level of Achievement / Grade	Date	Signature of Assessor
1 -Theoretical Knowledge				
1.1 Professional has an understanding of the indications for performing a skin prick test	o/p - d			
1.2 Professional demonstrates knowledge of infection control and precautions required for the procedure	o/p - d			
1.3 Professional can identify the contra-indications surrounding skin prick testing	o/p - d			
1.4 Professional is able to explain why the patient needs to be well and free from an acute illness	o/p - d			
1.5 Professional is able to identify signs of an acute allergic reaction.	o/p - d			
1.6 Professional is able to explain the need for a positive and negative control	o/p - d			
1.7 Professional is able to explain reasons for a repeat test	o/p - d			
2 - Equipment				
2.1 Professional is able to correctly identify and gather equipment needed for skin prick testing.	o/p - d			

2.2 Professional is able to gather emergency medication and equipment and explain their rational	o/p - d			
2.3 Professional checks expiry date of allergens	o/p - d			
3- Consent and Documentation				
3.1 Professional is able to obtain verbal consent from the patient and/or parent and document this	o/p - w			
3.2 Professional correctly identifies skin prick test request form, ensuring it is completed before commencing procedure	o/p - w			
3.3 Professional is aware of the Trust's policy for patient identification	o/p - d			
4 - Procedure				
4.1 Professional selects appropriate administration site and is able to provide a rational for this	o/p - d			
4.2 Professional marks the skin to indicate where each allergen will be placed ensuring an appropriate distance between each marker	o/p - w			
4.3 Professional demonstrates good dexterity and application of allergen solution next to correct marker	o/p - d			
4.4 After all allergens have been placed on the forearm, professional demonstrates ability to introduce the allergen into the top layers of the skin using a sterile lancet.	o/p - d			

4.5 Professional demonstrates ability to control appropriate pressure when using the sterile lancet so not to cause bleeding.	o/p - d			
4.6 Once all allergens have been applied, professional demonstrates ability to blot the excess fluid from all sites, taking care not to cross contaminate other sites.	o/p - d			
4.7 Professional is able to explain appropriate time frame for reading results	o/p - d			
4.8 Professional demonstrates ability to accurately measure size of wheal and identifies flare and pseudopodia	o/p - w			
4.8 Professional is able to document results clearly on the skin prick test request form	o/p - w			
4.9 Professional ensures the patient is comfortable	o/p - d			
4.1.1 Professional can demonstrate prick-to-prick method	o/p -d			

Photocopy of completed competencies to held in personal file

COMMENTS:

CONTRIBUTION LIST

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Circulated to the following CD's/Heads of dept for comments from their directorates / departments

Name	Directorate / Department

Circulated to the chair of the following committee's / groups for comments

Name	Committee / group
Paediatric Quality Improvement meeting	March 2024
Medicines Safety Committee Meeting	May 2024