SunKrist Publishing
Accelerate Scientific Knowledge in Open Access

SunKrist Journal of Neonatology and Pediatrics

Mini Review Article *Volume: 2, Issue: 1* *Scientific Knowledge*

Skin Prick Tests and Patch Tests in Children with Food Allergies

Chandra Sekhar Devulapalli*

Senior Pediatric Consultant and Medical Advisor, Norwegian Labour and Welfare Administration, Norway

1. Abstract

Diagnosing food allergies can be challenging for patients and health professionals. Standard diagnostic methods include skin prick testing, food-specific immunoglobulin E (IgE) and oral food challenge. There is no scientifically sufficient evidence for routine use of patch testing for food allergy evaluation in children.

2. Mini Review

Food allergy has no widely accepted definition. Shekelle et al. have suggested that food allergies are defined as a "negative immune response arising from exposure to a given food, which is reproducible and different from other food reactions, such as food intolerance, pharmacological reactions and toxin mediated reactions" [1]. Food allergies are heterogeneous both in terms of underlying pathophysiology (IgE-mediated and non-IgE mediated) and their clinical manifestations, ranging from mild rashes to life-threatening anaphylaxis. Food allergies in children are usually caused by an immune-mediated type 1 reaction. About a quarter of the population will have an abnormal reaction to food (of which food allergies are just one type) during their lifetime, most of which occur in infancy and early childhood [2]. An estimated 10-15% of children report food allergy symptoms, although the prevalence of IgE-mediated food allergies (ie, food allergy symptoms in the presence of food-specific IgE) is reported to be lower, with about 6-8% in children younger than 3 years. Studies from the United States show that 4-8 percent of children have symptoms of food allergy and at the same time positive specific IgE in serum [3,4]. A Swedish study examined 94 children whose parents thought they were food allergies, however only nine of these children had food allergies [5]. This shows that many people assume that they are allergic to some kind of food, without objective evaluation. Thus, there is a big difference between what many perceive as food allergies and what the specialists in the field can document about food allergies [5]. The most common cause of food allergies in infants is milk, eggs, wheat and fish, while peanut, tree nuts and shellfish are more common in older children.

The golden standard in allergy assessment is double-blind oral food challenge (OFC), where gradually increasing amounts of food are given at 20-30-minute intervals [6]. In most cases, however, it is sufficient to make an open provocation that is practically easier to carry out. However, it is not always easy to implement in practice. Blinding is necessary when there is a strong expectation of reaction from the patient/relatives and when the symptoms are of a

***Corresponding author:** Chandra Sekhar Devulapalli, M.D., Ph.D., Senior Medical Consultant and Paediatrician, Norwegian Labour and Welfare Administration (NAV), work and benefits Kristiania, Oslo, Norway, E-mail: chandev@gmail.com

Received Date: April 06, 2020; **Accepted Date:** April 10, 2020; **Published Date:** April 12, 2020

subjective nature. Indication for OFC is the desire to confirm/disprove suspected food allergy based on medical history and in patients who are sensitized but have never been orally exposed [6].

The literature on food allergies lacks a clear consensus on criteria for diagnosing food allergies. Numerous diagnostic tests have been suggested as useful additions to the clinical history of establishing the diagnosis. Standard sensitization tests include skin prick test (SPT) and food-specific serum IgE. These methods have certainly been useful in IgE-mediated disorders, including urticaria and anaphylaxis. However, it is challenging to diagnose patients who have non-IgE (cell mediated) or mixed (IgE mediated and cell mediated) disorder.

It is common to use SPT as simpler diagnostic markers for food allergies. The prick test is performed on the inside of the forearms. Small drops of the appropriate allergen extracts are applied to the skin. Then this is observed for about 20 minutes. During that time, the positive control (a histamine solution) will strike out with a blister or bleb, called three plus (+++) and there will be corresponding, slightly larger or slightly smaller blisters where extracts are inserted (suspected items patient is allergic to). With the availability of most common allergen sources, such SPT testing is reliable and has the advantage of providing an answer within half an hour.

The atopy patch testing (APT) can be used to determine if one is allergic to substances that come into contact with the skin. The patch test will patch different types of fabrics on the skin on the back. These patches should last for 48 hours. The patch test is relatively infrequently used in clinical practice. However, there is some interest in conditions such as atopic dermatitis and eosinophilic esophagitis [7,8]. It is however uncertain how reliable the patch test is when it comes to food allergies [9-11]. SPT and APT can produce conflicting results; for example, APT were positive in 67% of cases of acute reactions to milk challenge, while patch tests tended to be negative [7]. In the same study, APT were positive in 89% of those with delayed reactions, although SPT were often negative. APT showed high sensitivity and high specificity in the diagnosis of wheat allergy in children with gastrointestinal symptoms while sensitivity to detection of cow's milk allergy was has been low and therefore it is recommended that the diagnosis should be verified by OFC [9]. Results from another study showed that there is insufficient evidence for routine use of patch testing for egg and hives allergy evaluation [10]. In this study, the researchers examined the diagnostic accuracy of patch testing in relation to OFC. Luo et al. have found clinically relevant food allergies in 65% of children for eggs and 35% for cow's milk [11]. In this study, SPT and APT were performed in 243 children referred for evaluation of suspected egg or hives allergy (mean age, 51 months). This meta-analysis concludes that patch testing is specific but not sensitive to the diagnosis of food allergy in children [11]. More than 90% of IgE-mediated food allergies in children are caused by only eight common foods: cow's milk, soy, chicken eggs, peanuts, three nuts, wheat, fish and shellfish. According to a Norwegian study, non-IgE-mediated reactions appear to be much more common than IgE-mediated reactions to cow’s milk in the first year of life [12]. Cow milk allergy is diagnosed by clinical response to elimination and subsequent food provocation with cow's milk. The diagnosis is rarely difficult for patients who show an allergic reaction immediately after ingestion of cow's milk, but may be challenging in those with delayed reactions. Isolauri et al. have shown that APT were able to identify delayed clinical reactions in children with atopic dermatitis who had negative SPT [7]. The results should be interpreted with caution because the methods used for patch testing with foods were not standardized. The authors suggest that parallel prick testing and patch testing tests will increase the likelihood of early detection of food allergies in infants with atopic dermatitis [7].

Most physicians consider it necessary to perform OFC under double-blind conditions to confirm food allergy [5-7]. Unfortunately, the need for specialized personnel, time, expenses, risk of anaphylaxis and lack of criteria for what constitutes a positive OFC limits the widespread use of this test. However, a Finnish study indicates that open OFC gives the same results as double-blind OFC and close follow-up will be sufficient for practical clinical purposes, which also allows the diagnosis of delayed reactions [7].

From what we know today, SPT and specific IgE appear to be sensitive but not specific for the diagnosis of IgE-mediated food allergy [13]. There is a risk of overdiagnosis of food allergies in the general population due to a lack of understanding of diagnostic criteria and the limited sensitivity and specificity of existing tests for IgE sensitization. Proper interpretation of SPT and food specific IgE results requires assessment of the data in the context of clinical history. In addition, it is important that the physician's understanding of symptoms is consistent with clinical food allergy to distinguish false positives from true food allergy positives. Several studies show low reliability of patch tests for routine use in food allergy diagnostics. Food allergies in children cause significant anxiety in parents especially in social contexts. The children who had been found not to be allergic to food experienced that life had fewer restrictions and that socializing with others had become easier because they could eat more different foods [5]. It is important that children are thoroughly investigated by knowledgeable health professionals before being put on elimination diets to avoid nutritional problems.

References

1. Shekelle P, Maglione M, Riedl M. Food Allergy: Evidence Report. The Southern California Evidence-based Practice Center. 2020.
2. Devulapalli CS. Food intolerance in children. Tidsskr Nor Laegeforen. The J Norwegian Med Asso. 2020.
3. KJ Allen, JJ Koplin. The epidemiology of IgE-mediated food allergy and anaphylaxis. Immunol Allergy Clin North Am. 2012; 32: 35-50.
4. Chafen JJ, Newberry SJ, Riedl MA, Bravata DM, Maglione M, Suttorp MJ, et al. Diagnosing and managing common food allergies: a systematic review. JAMA. 2010; 303: 1848-1856.
5. Åsa Strinnholm: "Food hypersensitivity among school children - prevalence, quality of life and experiences of double-blind placebo-controlled food provocation". Doctoral degree at Department of Public Health and Clinical Medicine, Umeå University. 2017.
6. Bindslev-Jensen C, Ballmer-Weber BK, Bengtsson U, Blanco C, Ebner C, Hourihane J, et al. Standardization of food challenges in patients with immediate reactions to foods--position paper from the European Academy of Allergology and Clinical Immunology. Allergy. 2004; 59: 690-697.
7. Isolauri E, Turjanmaa K. Combined skin prick and patch testing enhances identification of food allergy in infants with atopic dermatitis. J Allergy Clin Immunol. 1996; 97: 9-15.
8. Spergel JM, Brown-Whitehorn T. The use of patch testing in the diagnosis of food allergy. Curr Allergy Asthma Rep. 2005; 5: 86-90.
9. Mowszet K, Matusiewicz K, Iwańczak B. Value of the atopy patch test in the diagnosis of food allergy in children with gastrointestinal symptoms. Adv Clin Exp Med. 2014; 23: 403-409.
10. Caglayan Sozmen S, Povesi Dascola C, Gioia E, Mastrorilli C, Rizzuti L, Caffarelli C. Diagnostic accuracy of patch test in children with food allergy. Pediatr Allergy Immunol. 2015; 26: 416-422.
11. Luo Y, Zhang GQ, Li ZY. The diagnostic value of APT for food allergy in children: a systematic review and meta-analysis. Pediatr Allergy Immunol. 2019; 30: 451-461.
12. Kvenshagen B, Halvorsen R, Jacobsen M. Adverse reactions to milk in infants. Acta Paediatr.

2008; 97: 196-200.

13. Soares-Weiser K, Takwoingi Y, Panesar SS, A Muraro. EAACI Food Allergy and Anaphylaxis Guidelines Group. The diagnosis of food allergy: a systematic review and meta-analysis. Allergy. 2014; 69: 76-86.

Citation: Chandra Sekhar Devulapalli. Skin Prick Tests and Patch Tests in Children with Food Allergies. SunKrist J Neonat Pediatr. 2020; 2: 1006.