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Egg Allergy

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Abstract

This section of my article is the continuation of my previous article which was on generalized food allergy. In the current article, I will focus on the THIRD allergy from that article i.e. egg allergy and its signs, symptoms, treatment and nutritional interventions in detail.
Egg allergy is a true food allergy in children and adults when they are hypersensitive to proteins found in eggs.

Keywords: Anaphylaxis, Pseudoallergy

Abbrevations: SPT: Skin Prick Test; IgE: Immunoglobulin E; sIgE: Serum Immunoglobulin E.

Egg Allergy

Egg allergy, like other food allergies, appears mainly in children but can also continue into adulthood. In children, it is the second most popular food allergy after cow's milk. However, most children outgrow it by the age of five, but some remain allergic for a lifetime too.

Symptoms of egg allergy

Symptoms of egg allergy may include rash, hives, itching of mouth, lips, tongue, throat, eyes, skin, or other areas, swelling of lips, tongue, eyelids, or the whole face, difficulty swallowing, runny or congested nose, hoarse voice, wheezing, shortness of breath, diarrhea, abdominal pain, lightheadedness, fainting, nausea, or vomiting [1]. Symptoms vary individually and in occurrence. Serious threat regarding egg allergy can begin when the respiratory tract is affected which can be indicated by wheezing or blocked airway. Blood circulation may also be affected which can be indicated by weak pulse, pale skin, and fainting. Such signs trigger the allergic reaction called anaphylaxis in which IgE antibodies are involved, and areas of the body that are not in direct contact with the food become affected and show severe symptoms. If left untreated, this can proceed to vasodilation, a low blood pressure situation called anaphylactic shock, and consequently to death which is rare.

Young children usually experience dermatitis or eczema on face, scalp and other parts of the body, while in older children knees and elbows are more commonly affected. Children suffering with dermatitis are at greater than expected risk of also experiencing asthma and other Allergic rhinitis [2].

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Non-allergic intolerance

Egg whites sometimes also stimulate a non-allergic response in some people in which it directly triggers the release of histamine from mast cells. Because this mechanism is classified as a pharmacological reaction, the reaction is considered food intolerance instead of a true immunoglobulin E (IgE) based allergic reaction. The response is usually in the gastrointestinal tract. Symptoms may include abdominal pain or diarrhea and severity can result in an anaphylactic reaction, which is clinically in-differentiable from true anaphylaxis. Few people with this condition can tolerate small quantities of egg whites and well-cooked eggs, such as found in cake or dried egg-based pasta, than incompletely cooked eggs, such as fried eggs or meringues, or uncooked eggs [3].

Diagnosis of egg allergy

Diagnosis of egg allergy depends on the person's history of allergic reactions, his skin prick test (SPT), patch test and measurement of egg-specific serum immunoglobulin E (IgE or sIgE) in the blood test. Confirmation can be done by double-blind, placebo-controlled food challenges. For young children, attempts are made to identify SPT and sIgE responses strong enough to avoid the need for a confirming oral food challenge [4].

Prevention of egg allergy

Prevention of egg-allergic reactions means completely avoiding eggs and egg-containing foods. People are also allergic to other types of eggs such as goose, duck, or turkey eggs when they are allergic to chicken eggs. In cooking, eggs act as a versatile product like in mayonnaise, they act as an emulsifier to reduce oil/water separation; in meatloaf, they act as a binder to bind water and the product; in angel foods, they act as an aerator etc. Some commercial egg substitutes can also be used for functions like water binding; whey protein for aeration or particle binding, or soy lecithin or avocado for emulsification. Some food companies also make egg-free mayonnaise and other replacement foods [5].

Most people find it necessary to strictly avoid any item containing eggs, including dried egg solids, powdered egg, eggnog, mayonnaise, meringue or meringue powder. Artificial flavorings, natural flavorings, lecithin and nougat candies are some ingredients that sometimes include egg protein.

Health Issues

Egg white consists primarily of about 90% water into which is dissolved about 10% proteins (including albumins and globulins). Although egg whites are considered as a source of low-fat, high-protein nutrition, but regardless a small number of people cannot tolerate them easily. Egg allergy is more common among infants than adults, but most children surpass it when they reach the age of five. Similarly, allergic reactions against egg whites are more common than egg yolks. Besides the true allergies, some people also experience food intolerance to egg whites. Eggs are usually susceptible to Salmonella contamination but thorough cooking eliminates the direct threat. However, threat of cross-contamination remains if people handle contaminated eggs and then touch other foods or items in the kitchen, thus spreading the bacteria and promoting the allergy [6].

Egg white is an alkaline solution and contains around 148 proteins. Ovalbumin in 54%, Ovotransferrin is 12%, ovomucoid is 11%, ovoglobulin is 4%, and other proteins in minute quantities [7]. The total number of egg proteins is not known, but more than 40 have been suggested for egg white alone, and up to 24 different antigenic protein fractions have been isolated. Although the main allergens are found in egg white, egg yolk also contains a large amount of specific IgE-binding allergens. Three proteins i.e. apovitellenins I & VI and phosvitin have been shown to bind IgE with specific IgE of egg yolk. Both same and different allergenic molecules are present in egg. Although cross-reactivity between egg white and egg yolk is not common cross-contaminated, some degree of cross allergenicity has been demonstrated between hen's egg white and egg yolk proteins, signifying that there are a number of allergenic determinants [8].

Most people who are allergic to hen's eggs have antibodies which react to one of four proteins in the egg white, Ovomucoid, ovalbumin, Ovotransferrin and lysozome. The egg yolk contains several

potential antigens: livetin, apovitillin and phosvitin. A person who reacts only to a protein in the egg yolk may be able to easily tolerate egg whites and vice versa. Some people may be allergic to proteins in both egg whites and egg yolk. Egg yolk allergies are somewhat more common in adults. A small number of people who are allergic to eggs will develop an allergy to chicken or other poultry meats.

Discussion

The dietitian's role in food allergy management

When the child is first diagnosed with food allergies, the first thing his mother thinks of is feeding the child and how will she make sure that she is providing foods that are nutritious but won't trigger an allergic reaction. Obviously, a dietitian may be the first person who pops her mind or perhaps the allergist also recommends a dietitian to help the mother to plan an allergen-free diet.

How a dietitian can help your child

During a visit with a dietitian, she will discuss the child's normal intake with the mother. Also, she will discuss symptoms that have occurred with the ingestion of suspected foods. Then, the dietitian will compare the nutritional needs of the child with current intake. This will help to determine if more nutrition-dense foods or supplements are necessary. The dietitian will outline a meal plan. The nutritionist will provide the mother with food/symptom diaries and a list of foods to avoid. He/she will give her suggestions for meals including which foods to use. The mother must make sure to schedule a follow-up visit. The follow-up visit allows discussing progress, as well as concerns. The dietitian may also need to make an alternate plan for suggestions that did not work.

The role of the dietitian differs between countries depending on the extent of the physician's role in the dietary management. In some countries the dietitians are trained to be involved in the diagnosis, while in other countries the dietitians are involved in the dietary management only. Nutrition plays a key role in the development, maintenance, and optimal functioning of immune cells. Nutrients, such as zinc and vitamin D and nutritional factors, such as pre- and Probiotics, can influence the nature of an immune response and are important in ensuring appropriate functioning of the immune system [9].

Conclusion

The cornerstone of the nutritional management of food allergies is an individualized allergen avoidance management plan. In children, the main goals are to prevent the occurrence of acute and chronic symptoms by avoiding the offending food(s), whilst providing an adequate, healthy and nutritionally balanced diet and maintaining optimal growth; ideally, under the guidance of a trained dietitian. Complete avoidance of the allergen is still required by some, but latest developments in food allergy have indicated that some individuals with food allergies tolerate baked forms of milk. It is known that children and families with food allergies experience a decreased quality of life across a number of domains, which can create anxiety and lead to avoidance of social situations. Hence, it is suggested that liberalization of the diet, when appropriate and safe, will increase both quality of life and nutritional intake.

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