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The assesment of allergy in children - case study

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Abstract

For more than 50 years, many children with allergies and other forms of dietary protein intolerance have been treated successfully with protein hydrolysates with highly reduced allergenicity and, more recently, also with products based on amino acid mixtures. Food allergies are increasing in prevalence at a higher rate than can be explained by genetic factors, suggesting a role for as yet unidentified environmental factors.The intestinal epithelium forms the interface between the external environment and the mucosal immune system, and emerging data suggest that the interaction between intestinal epithelial cells and mucosal dendritic cells is of particular importance in determining the outcome of immune responses to dietary antigens.

After we filled the questionnaires by children, we estimated the level of the eosinophyle and immunoglobulin E (IgE) in the blood. We have used the color methods and blood striche to diagnose the eosiniphilia presence. To determine the IgE are used the EIA kits.

In this article, we summarize the state of knowledge about the healthy immune response to antigens in the diet and the basis of immune deviation that results in IgE sensitization and allergic reactivity to foods. The IgE level is so high and at the same of time and the level of eosynophiles is high in each case of food allergy in children.

After collecting the questionnaire data were processed and resulted positive 6.2% (56 cases out of 900 cases in total). Individuals who were allergic to different foods, the serum that was tested by ELISA to see the levels of the total IgE. 7% of the total positive cases have 165-175 UI/ml IgE level, at intervals of IgE from 176 to 186 UI/ml resulted 21% positive cases, at intervals of IgE from 187 to 197 UI/ml, resulted 34% positive cases, and in the intervals of IgE 197-207 UI/ml, resulted positive to food allergy 38% of the cases. In cases positive for allergy to food, we studied the level of eosinophyle. Eosinophyle level has shown that in all cases their allergies have increased, indicating that higher eosinophylia is one of the main parameters of allergies caused by food

In almost all cases of children who are allergic to different foods, it has increased levels of IgE, which otherwise is called allergic immunoglobulin, and increased eosinophyle as polymorphonuclear leukocytes, which emit their promotion contents granules that helps shown of allergic signs. Certain syndromes occur in children or individuals who are allergic to different foods, fruits or vegetables either.

Keywords: immune response; food allergy; immunglobulin; antigen.

1. Introduction

A food allergy is an adverse immune response to a food protein. Food allergy is distinct from other adverse responses to food, such as food intolerance, pharmacologic reactions, and toxin-mediated reactions.

The food protein triggering the allergic response is called a food allergen. It is estimated that up to 12 million Americans have food allergies, and the prevalence is rising [1, 2, 4]. Food allergies cause roughly 30,000 emergency room visits and 100 to 200 deaths per year in the United States [3, 5]. The most common food allergies in adults are the result of eating shellfish, peanuts, tree nuts, fish, and eggs, and the most common food allergies in children are cow milk, eggs, peanuts, and tree nuts.

An allergy is a disease related to immunological reactions that take place in the body and as a result of displaying clinical signs of inflammation such as redness, swelling, itching etc. It depends on several factors including age, gender, lifestyle and genetic predisposition. Allergy is a common disease that arises as a result of abnormal functioning of the immune system. This is due to exposure to a specific antigen (allergen) against a person who has already developed antibodies against this allergen [6,7]. These allergens come into contact

with our body through the skin, respiratory system and food. Food allergies are caused by food's proteins, or allergens, which recognized as foreign subject by the immune system.

An allergen is usually a soluble antigen that reacts with IgE antibodies present in the body. Allergens pass the skin layers and once they are inside, the organism, they grabbed by the antigen presenting cells (APC) [8, 9, 10]. APC processes the antigen in proteins with 10-12 amino-acids and extracts it to the surface where it gets united with MHC (Major Histocompatibility Complex). APC interacts with the (helper) cells that enable the activation of B cells which produce IgE antibodies that bind to mast cells. Following a second contact with the allergen, the mast cells which are respectively connected with IgE, release granules with histamine. The immediate response is caused by the direct effects of histamine release from mast cells in blood vessels [11, 12, 13]. A later stage caused by an influx of other immune cells such as eosinophiles, basophiles and mediator release from mast cells caused by the first immunologic response. Most forms of diseases like Asthma, Anaphylaxis, skin swelling, itching, come as a result of reactions of type I of immune hypersensitivity.

The best way to reduce symptoms is to understand the cause of allergies. There are certain types of medicinal products to prevent or treat allergies, such as drugs that are recommended, depending on the type and frequency of symptoms, age or health conditions [14,15]. One way to prevent allergies is hypo sensibility method whereby small doses of allergens, to which the patients' body interacts, are injected into the body. This is an attempt to teach the body not be so sensitive to these allergens. For this reason they are produced vaccines to prevent allergies [16].

2. Material and Methods

In a one year period, 2016, 1840 students were sampled. They were firstly asked to fill in a questionnaire with questions about the allergies and allergy symptoms. We took biological samples (blood) according to the respective procedures and preserved them in suitable conditions from the students who were thought to be allergic or who thought they were allergic to different kind of food [12],

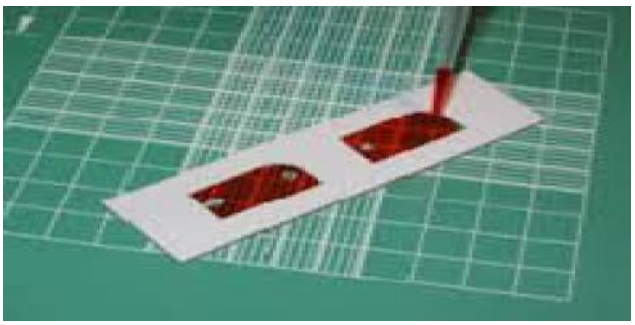

Figure 1. Preparing of blood

Figure 2. The microscope for observing of eosinophyles

First we took the periphery blood in special tube and then we put some of the blood in a glass slide. A dyer is added to the sample, which make the eosinophiles to look like circles filled with red granules. Then the technician counts how many eosinophiles were present in a 100 cells (Figures 1and 2). The percentage of eosinophiles is multiplied by the number of the white cells in order to give the absolute [12].

We use and Patch test or skin test for some food allergen (Figure.3). Skin tests use extracts -- a concentrated liquid form -- of common allergens like different foods. Once the allergen gets in your skin, it could trigger a rash. The skin will get irritated and may itch, like a mosquito bite.

Figure 3. Skin Patch test for food allergen

3. Results and Discussion

Initially, we distributed a questionnaire to 1840 students, with questions about signs, symptoms, or problems that the students of this age group have with any kind of food, during or after consuming it.

After collecting the questionnaire data were processed and resulted positive 6 % (110 cases out of 1840 cases in total).

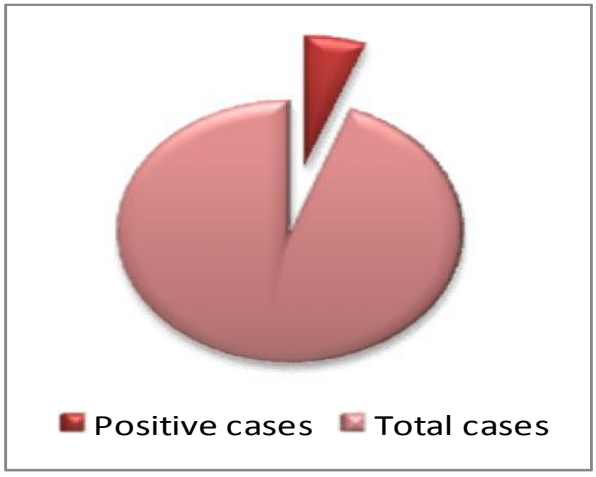

Figure 4. The results of questionaires

We observed skin patch test in the student who suffer from food allergy or who were doubt about it. Skin testing is a safe and fairly easy way to try to figure out or confirm what's causing food allergy symptoms. It is through the reaction that we could tell if they were allergic to a substance.

We examined the increasing eosinophiles in the student's blood that were the allergic from different food (Fig.5).

In positive cases of allergies to food, we studied as well the level of eosinophiles. Eosinophiles level has shown that in all the allergy cases there is an increase of them, indicating that high eosinophilia is one of the main parameters of allergies caused by food.

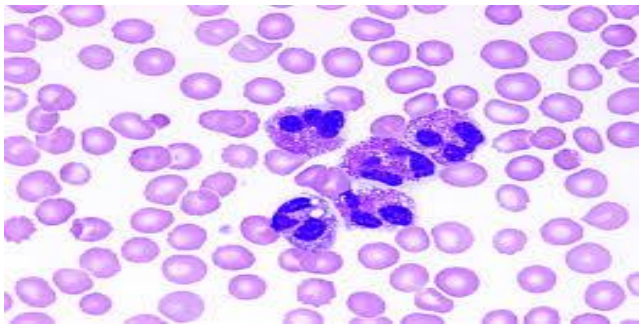

Figure 5. Eosinophils in the bood of allergic students

It is seen how the increased values of the eosinophilia cells have varied in the blood or in the serum of the persons diagnosed. It is noticed that in 6,8 % of the studied cases, the increased values of the eosinophilia in the serum of the blood vary from 0,7-0,8 x $10^3/mm^3$ cells. Only in 3 % of the cases the number of the eosinophilia was 0,8 - 0.9 x 10^3/mm3. This increase in the number of the eosinophilia in these individuals with more than 0,7 x $10^3/mm^3$, leads to the hypothesis that the eosinophilia assessed as an increase of the number of the eosinophilia cells in the peripheral blood is an association to the immune answer in the reaction caused by food.

After we collected the questionnaires we did the skin patch of 110 students, from 1840 in total that had signs of allergies caused by various foods, mainly by eggs, nuts, peanuts etc. (Fig 7).

Regarding Fig.7 it is seen that most of the cases with food allergy in this age are caused by the consumption of the yolk, 52% of the cases, accompanied by 28% of the whole total is due to the consumption of fish and seashells, 15% by peanuts and treenuts and only 3% by soya.

From the positive cases derivate by questionnaires and skin patch test, [5, 9]. Other symptoms, for almost all the positive cases were abdominal pain, vomiting and diarrhea. Also in the respiratory organs we have asthma or hoarseness of voice. Hence, allergic reactions to food include almost all the major organs as the digestive, respiratory, etc

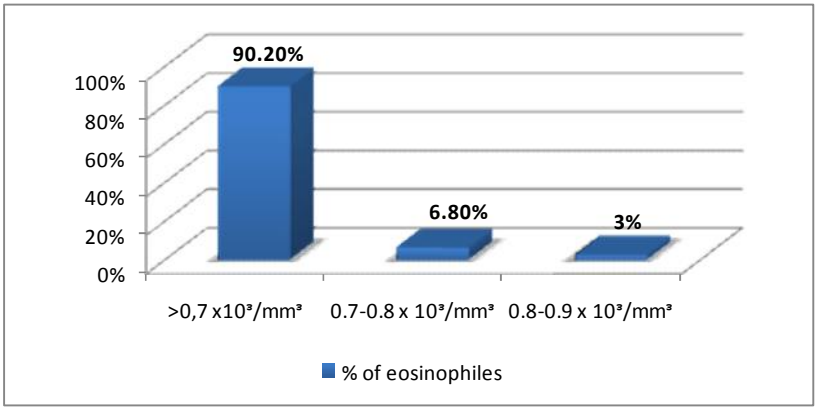

Figure 6. Distribution of eosinophils level in positive cases of food allergies

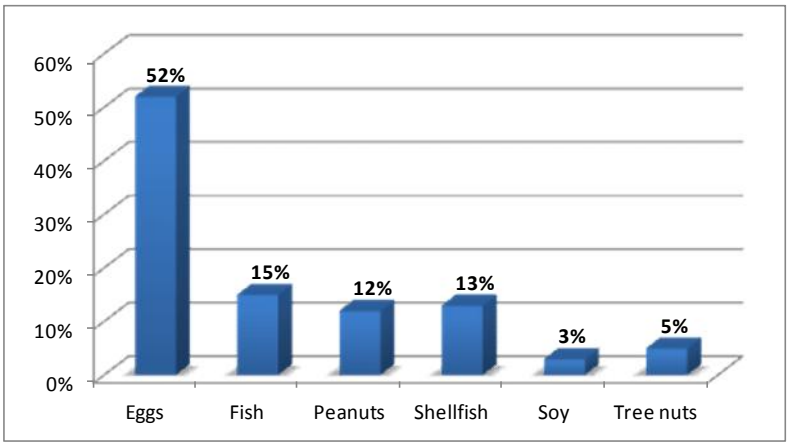

Figure 7. The percentage of the allergy cases related to various food

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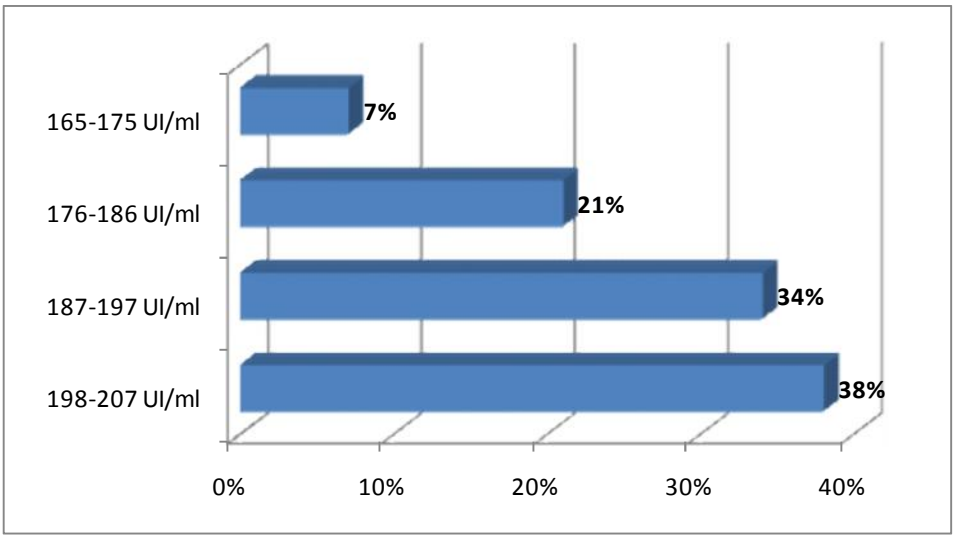

Figure 8. The percentages of IgE level on allergy cases

Individuals who were allergic to different foods, the serum that was tested by ELISA to see the levels of the total IgE (Fig 8). 7% of the total positive cases have 165-175 UI/ml IgE level, at intervals of IgE from 176 to 186 UI/ml resulted 21% positive cases, at intervals of IgE from 187 to 197 UI/ml, resulted 34% positive cases, and in the intervals of IgE 197-207 UI/ml, resulted positive to food allergy 38% of the cases.

4. Conclusions

In cases positive for allergy to food, we studied the level Immunoglobulin E and eosinophies. Eosinophyles level has shown that in all cases their allergies have increased, indicating that higher eosinofilia is one of the main parameters of allergies caused by food.

5. Recommendations

Avoidance of cross-contact (eg, through shared utensils or fryers) of allergens with otherwise safe foods during meal preparation

Elimination of only those foods that are confirmed as provoking allergic reactions; both obvious and hidden sources of food allergens (eg, medications and cosmetics) must be considered

Consideration of potential exposures by route other than ingestion (eg, skin contact or inhalation)

Anticipation of potential candidates for food allergen cross-reactivity (eg, eggs with chicken or cow milk with beef)

Avoidance of high-risk situations where accidental or inadvertent ingestion of food allergens can occur (e.g., buffets or picnics)

Adherence to avoidance measures notwithstanding, accidental or inadvertent ingestions may occur and lead to a reaction.

6. References

1. Bruijnzeel KC, Ortolani C, Aas K. **Adverse reactions to food.** European academy of allergology and clinical immunology subcommittee. Allergy 1995;50:623–35.
2. Commission of the European Communities. **Commission directive 96/4 EC of 16 February 1996 amending directive 91/321/EEC on infant formulae and follow-on formulae**. Official Journal of the European Commission 1996;39:12–16.
3. De Jong MH, Scharp-van der Linden VTM, Aalberse RC, Oosting J, Tijssen JGP, de Groot CJ. **Randomised controlled trial of brief neonatal exposure to cows' milk on the development of atopy**. Arch Dis Child 1998;79:126–30.
4. Halken S, Host A. **How hypoallergenic are hypoallergenic cow's milk based formulas?** Allergy 1997;52:1175–83.
5. Halken S, Host A. **Prevention of allergic disease. Exposure to food allergens and dietetic intervention.** Pediatr Allergy Immunol 1996;7(suppl 9):102–7.
6. Host A. **Cow's milk protein allergy and intolerance in infancy.** Some clinical, epidemiological and immunological aspects. Pediatr Allergy Immunol 1994;5(suppl 5):1–36.
7. Host A, Husby S, Osterballe O. **A prospective study of cow's milk allergy in exclusively breast-fed infants.** Acta Paediatr Scand 1988;77:663–70.
8. Lika (Çekani) M., Bërxholi K. **Hypersensitivity Reactions** "Reaksionet e mbindjeshmërisë". Imunologjia (Immunology). 2007. 154-163.
9. Lucas A, Brooke OG, Cole TJ, Morley R, Bamford JTM**. Food and drug reactions, wheezing, and eczema in preterm infants.** Arch Dis Child 1990;65:411–15.
10. Lee YH. **Food-processing approaches to altering allergenic potential of milk-based formula.** J Pediatr 1992;121:S47
11. Moneret VD. **Modifications of allergenicity linked to food technologies.** Allerg Immunol (Paris) 1998;30:9–13.
12. Papajorgji M. **Metodat klinike, mikrobiologjike dhe imunologjike** (Clinic, microbiological and immunological methods). 2003. 22-27, 95-99.
13. Rigo J, Salle BL, Picaud JC, Putet G, Senterre J. **Nutritional evaluation of protein hydrolysate formulas**. Eur J Clin Nutr 1995;49(suppl 1):S26–38.
14. Saarinen K, Juntunen-Backman K, Järvenpää AL. **Early feeding of cow's milk formula—a risk for cow's milk allergy** [abstract]. J Pediatr Gastroenterol Nutr 1997;24:461.
15. Szepfalusi Z, Nentwich I, Gerstmayr M. **Prenatal allergen contact with milk proteins**. Clin Exp Allergy 1997;27:28–35.
16. Witteman AM, van Leeuwen J, van derzee J, Aalberse RC. **Food allergens in house dust.** Int Arch Allergy Immunol 1995;107:566–8.