

ORAL ALLERGY SYNDROME – DETERMINATION OF SPECIFIC IGE

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ABSTRACT

INTRODUCTION: Oral allergy syndrome (OAS) is a form of food allergy. It develops mostly in patients with pollinosis, but also could be a manifestation of the so-called latex-fruit syndrome. OAS is probably a result of immunological cross-reactions due to common allergens or their epitopes in pollens, latex and foods of plant origin. Our purpose was to determine the extent of sensibilization to pollens and plant-derived foods in cases of OAS through in vitro allergy tests.

METHODS AND MATERIALS: We studied 60 patients with OAS after food intake. The survey included allergic history, examination and skin prick tests (SPT) with pollen and food allergens. Specific IgE to pollens and foods were determined through Euroline and ImmunoCAP system in the cases of highly expressed SPTs.

RESULTS: Specific IgE were determined in 17 patients (male and female). Both tests demonstrated similar results. Most of the patients showed hypersensitivity to more than two allergens as sensitized males prevailed. Positive results were of higher class in males also. We registered very big up to functional correlation in the hypersensitivity to birch, apple and hazelnut allergens.

CONCLUSION: OAS patients show concomitant hypersensitivity to many allergens as sIgE levels to pollens and fruits are the highest.

Keywords: oral allergy syndrome, specific IgE, food allergy, pollen-food syndrome

INTRODUCTION

Oral allergy syndrome (OAS) is a form of food allergy. It was described in 1987 by Amlot and Ortolani as a type I hypersensitivity reaction, affecting patients allergic to pollens, and following the direct contact of oral mucosa with foodstuffs of plant ori-

gin mainly (apple, cherry, pear, peach, apricot, melon, kiwi, avocado, banana, hazelnut, carrot, tomato, potato, etc.) (1,2,3).

The symptoms of OAS are oropharyngeal pruritus, smarting, papules and vesicles on the mucosa of the lips, labial swelling (Fig. 1), sensation of pharyngeal swelling.

They **appear very quickly**, almost immediately, or a few minutes (15 minutes) after contact with the foodstuff. The condition may be aggravated by the end of the first hour with urticaria, contiguous facial erythema, laryngeal swelling or even with anaphylactic shock (4).

OAS is the most common clinical manifestation of the so-called **pollen-food syndrome**. 25% - 30% of all Europeans, allergic to pollens, report for

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Fig. 1. Labial swelling after kiwi intake.

OAS after consumption of **fresh** fruits and vegetables. OAS affects mostly people sensitized to wood pollens (birch) and seldom people sensitized to grass pollens (5-8).

OAS could also be a manifestation of the so-called **latex-fruit syndrome** (9). It is probably a result of immunological cross-reactions due to common allergens or their epitopes in pollens, latex and foods of plant origin (10).

Our **purpose** is to determine the extent of sensitization to pollens and plant-derived foods in cases of OAS through in vitro allergy tests.

MATERIAL AND METHODS

We studied **60** patients with OAS after food intake. The survey included:

- ❖ Allergic history – patients were asked about their allergies in general and about food allergy; about the foodstuffs that provoked the food allergy and its manifestations.
- ❖ Examination – we performed intraoral and extraoral examination, looking for current symptoms (local and general).
- ❖ Skin prick tests (SPT) with pollen and food allergens – with pork, cow's milk, egg white, tomato, potato, carrot, hazelnut, chicken, milk chocolate, peanut, soy bean, Dermatophagoides pteronyssinus, mugwort, ragweed, birch, Alternaria.
- ❖ Determination of specific IgE (sIgE) to pollens and foods through Euroline and ImmunoCAP system **in the cases of marked history and highly expressed SPTs** (17 patients).

Euroline sIgE technology is used for determination of specific IgE in serum and clarification of allergic reactions to inhalation allergens, food allergens and cross-reactive allergens (pollen-associated food allergies). The serum antibodies are detected by allergens on the test strips. The strips then are automatically incubated and evaluated using the system EUROLIneScan.

ImmunoCAP technology is used in this study for quantitative measurement of specific IgE in undiluted serum. It is applied in patients with positive SPTs and in vitro determined atopic hypersensitivity. The principle of the assay is as follows: the specific allergen of interest, covalently coupled to ImmunoCAP cellulose carrier (sponge), reacts with the specific IgE in the patient serum sample; the complex is incubated twice; after stopping the reaction, the sponge is compressed and the fluorescence of the resulting eluate is measured.

Values below 0.35 kU/l we consider negative (class 0), values between 0.36-0.70 kU/l – threshold ones (class 1), and values above 0.71 kU/l – positive ones (classes 2 – 6).

Statistical analysis is performed by using SPSS for Windows, version 16.0. We accept a critical level of significance $\alpha = 0.05$. Corresponding zero hypothesis is rejected when the value $p < \alpha$.

RESULTS

Specific IgE are determined **in 17 patients** (males and females). Both tests demonstrate similar results. Most of the patients show hypersensitivity to more than two allergens as sensitized males prevail.

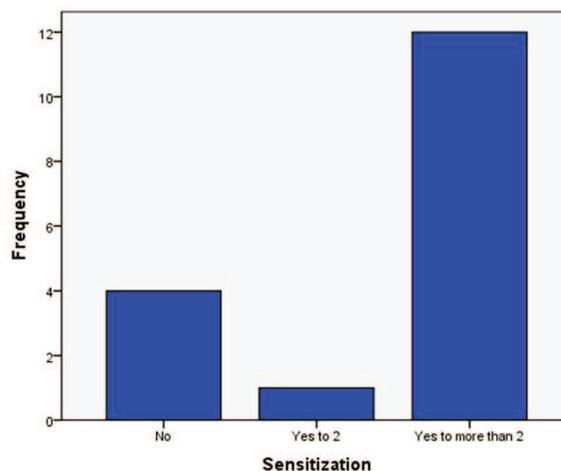


Fig. 2. Distribution of Euroline test results.

Euroline results: We find out that 76.5% of patients are sensitized to 2 and more than 2 allergens (Fig. 2). The positive results in males are insignificantly more than in females (Fig. 3).

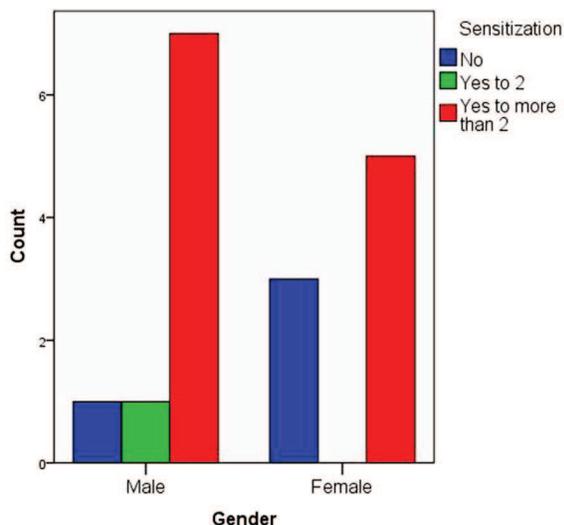


Fig. 3. Gender distribution of Euroline test results

We investigated the relationship between gender and strength of the immune response to specific food allergens and found that positive results are of higher value in males, as this relation is most pronounced in potatoes and cow's milk. We explored also the correlation in sensitization to particular food and pollen allergens and determined that cases of significant positive correlation are prevalent.

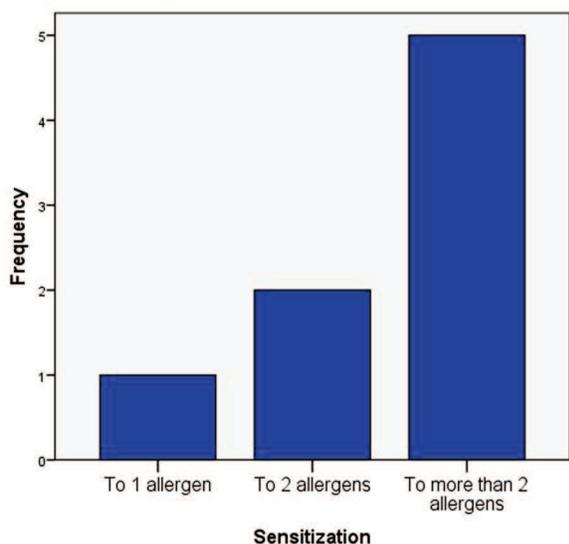


Fig. 4. Distribution of ImmunoCAP test results

ImmunoCAP results: 87.5% of patients show positive results to 2 and more allergens (Fig. 4). The positive results in males are significantly more than in females (Fig. 5).

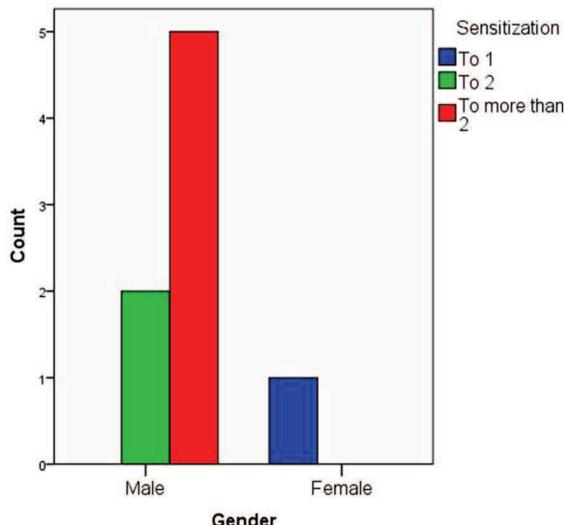


Fig. 5. Gender distribution of ImmunoCAP test results

We find that positive immune response in males is of higher class – class 3 prevails. We also register functional correlation in the hypersensitivity to pollen and food allergens (Table 1).

Table 1. Value and level of significance of correlation in sensitization to particular food and pollen allergens

Correlating allergens	r	p
Birch (t3) – Hazelnut (f17)	0.963	0.009
Birch (t3) – Soya (rGly m4)	1.000	0.000
Birch (rBet v2) – Apple (f49)	1.000	0.000
Birch (rBet v2) – Grasses (gx1)	1.000	0.000
Birch (rBet v2) – Soya (rGly m4)	-1.000	0.000
Hazelnut (f17) – Soya (f14)	1.000	0.000
Hazelnut (f17) – Grasses (gx1)	-1.000	0.000
Apple (f49) – Soya (rGly m4)	-1.000	0.000

DISCUSSION

Specific IgE antibodies to food and pollen allergens are determined in most of the cases of OAS, as the levels of sensitization to fruit and pollen allergens are the highest. These are usually cases of multiple sensitizations and the correlation in sensitization to apple and hazelnut is marked. It is unusual that we find **no** correlation between sensitization to birch pollen and related fruit allergens through Euroline test, but we attribute this fact to the relatively small number of patients studied.

The ImmunoCAP results show the highest sensitization to birch pollen and grass pollens, but the latter is a single case of class 6 IgE. The test confirms our data from a previous study. The results are also consistent with literature data.

The only unusual fact is the calculated functional negative correlation between sensitization to birch allergen rBet v2 and soya allergen rGly m4.

The calculated very big to functional positive correlation in sensitization to birch, apple and hazelnut is consistent with literature data. Another Bulgarian study in 2008 confirms also the correlation in sensitization to birch pollen and fruits in patients with OAS (11).

CONCLUSIONS

OAS patients show concomitant hypersensitivity to many allergens as sIgE levels to pollens and fruits are the highest. Higher grade of hypersensitivity to food allergens is registered in males. In cases of sensitization, correlation in the hypersensitivity to birch, apple and hazelnut allergen is very big to functional.

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