The Role Of Th1 And Th2 Response In Allergic Rhinitis Children With Or Without Sensitization To Food Allergens

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Rationale: Patients with allergic rhinitis (AR) show allergic symptoms to fruits, vegetables and nuts in 48-72%. Oral allergy syndrome (OAS) is based on cross-reaction of pollen-allergen specific IgE with homologous food proteins. In AR pathogenesis there is a prevalence of Th2 response with an ensuing increase in cytokines production.

This study investigated the cytokines production by Th1 and Th2 in AR children with or without sensitization to food allergens.

Methods: Sixty children (8-12 years) with AR were observed. Group I 32 AR patients; group II 28 AR and OAS patients. Sensitivity to pollen allergens was tested by SPT. Food allergy in OAS patients was determined by questionnaire and SPT. IL-5, IL-10, γ-IFN levels were measured by ELISA.

Results: 26.7% of patients were sensitized to grass', 20.0% to trees and 53.3% to grass', trees and weeds pollen. OAS patients more often had positive SPT to birch, alder, mugwort. 71.4% of gr.II had allergic reactions to food: hazelnut, apple, carrot, peanut.

Fruits and vegetables sensitivity was confirmed by SPT in 78.6%. Blood eosinophils and total IgE were elevated in all patients. IL-5 production increased to 163.4±5.1 pg/ml in gr.I and 198.3±6.2 in gr.II, and IL-10 to 146±9 in gr.I and 177±8 in gr.II. The γ-IFN level decreased to 257.6±6.2 in gr.I and 232.6±5.2 in gr.II.

Conclusions: AR children can be sensitized to food allergens that may cause OAS, especially in patients with increased functional activity of Th2. The function of Th2 (identified by cytokines production) was activated in AR patients, especially in combination with OAS.

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THE ROLE OF TH1 AND TH2 RESPONCE IN ALLERGIC RHINITIS CHILDREN WITH OR WITHOUT SENSITISATION TO FOOD ALLERGENS

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Rationale

Patients with allergic rhinitis (AR) demonstrate symptoms of allergy to fruits, vegetables and nuts in 48-72% of cases. Oral allergy syndrome (OAS), typical for hypersensitivity to plant food, is based on cross-reaction of pollen-allergen specific immunoglobulin E (IgE) antibodies with homologous food proteins. In the pathogenesis of AR there is a prevalence of Th2 response with an ensuing augmentation of IL-4, IL-5, IL-10 and IL-13 cytokine production.

The purpose of the study is to investigate the cytokines production by Th1 and Th2 in AR children with or without sensitization to food (fruits and vegetables) allergens.

Methods

Sixty children aged 8-12 years with AR were observed. Group I - 32 AR patients; group II - 28 AR and OAS patients.

Sensitivity to pollen allergens was tested by skin prick test (SPT).

The allergic reaction to food in patients with OAS was proved by positive history of oral symptoms caused by eating fruit and vegetables and positive SPT with respective food allergens.

Blood eosinophil count and total IgE level were determined in the peak of AR symptoms. IL-5, IL-10, γ-IFN levels were measured by ELISA.

Results

There was determined a total of 26.7% patients were sensitized only to grass' pollen, 20.0% only to trees pollen and 53.3% reacted to pollen of grasses trees and weeds ($p<0.01$) (table 1).

In OAS patients skin prick test were more often positive to birch (67.9%), alder (42.9%), and mugwort (21.4%).

The allergic reactions to food according to the questionnaire data were detected in 20 patients of gr.II (71.4%).

As it is shown in table 2 the most common food products implicated in OAS were: hazelnut

(63.4%), apple (35.7%), carrot (21.4%), peanut (14.3%)

The allergy to fruit and vegetables was confirmed by positive SPT in 78.4%.

During the season blood eosinophil count were elevated in both groups of patients and average index was 17±2%.

Total IgE level was elevated in all patients to 525 ± 17 IU/ml.

The most interest of our study was to determine which kind of immune responce are prevalent in patients with AR and with AR and OAS. In this case we investigated the level of the cytokines' production by Th1 and Th2 in allergic rhinitis patients with or without sensitisation to food (fruit and vegetables) allergens.

The results were shown (table 3, picture 1) there was an increased IL-5 production to 163,4±5,1 in gr.I and to 198.3±6.2 pkg/ml in gr.II (N=74.3±3.3 pkg/ml) ($p<0.001$).

The level of IL-10 increased to 146±9 pkg/ml in gr.I and to 177±8 pkg/ml in gr.II (N=5.8±0.25 pkg/ml) ($p<0.001$) (pic.1).

At the same time the γ-IFN level decreased to 257,6±6,2 pkg/ml in gr.I and to 232.6±5.2 in gr.II (N=331±35 pkg/ml) (pic.1), although both of these indexes were not statistically authentically.

Conclusions:

1. Investigation confirm that AR children can be sensitized to food allergens that may be cause of OAS in this patients, especially in patients with increase functional activity of Th2.
2. The function of Th2 (what was identified on the cytokines' production) was activated in AR patients and even more significantly in patients with AR and OAS.

Table1

Sensitisation to pollen in AR children

Grass pollen	Trees pollen	Grass, trees, weeds pollen
26,7%	20,0%	53,3%

Table2

Sensitisation to food allergen in children with AR and OAS

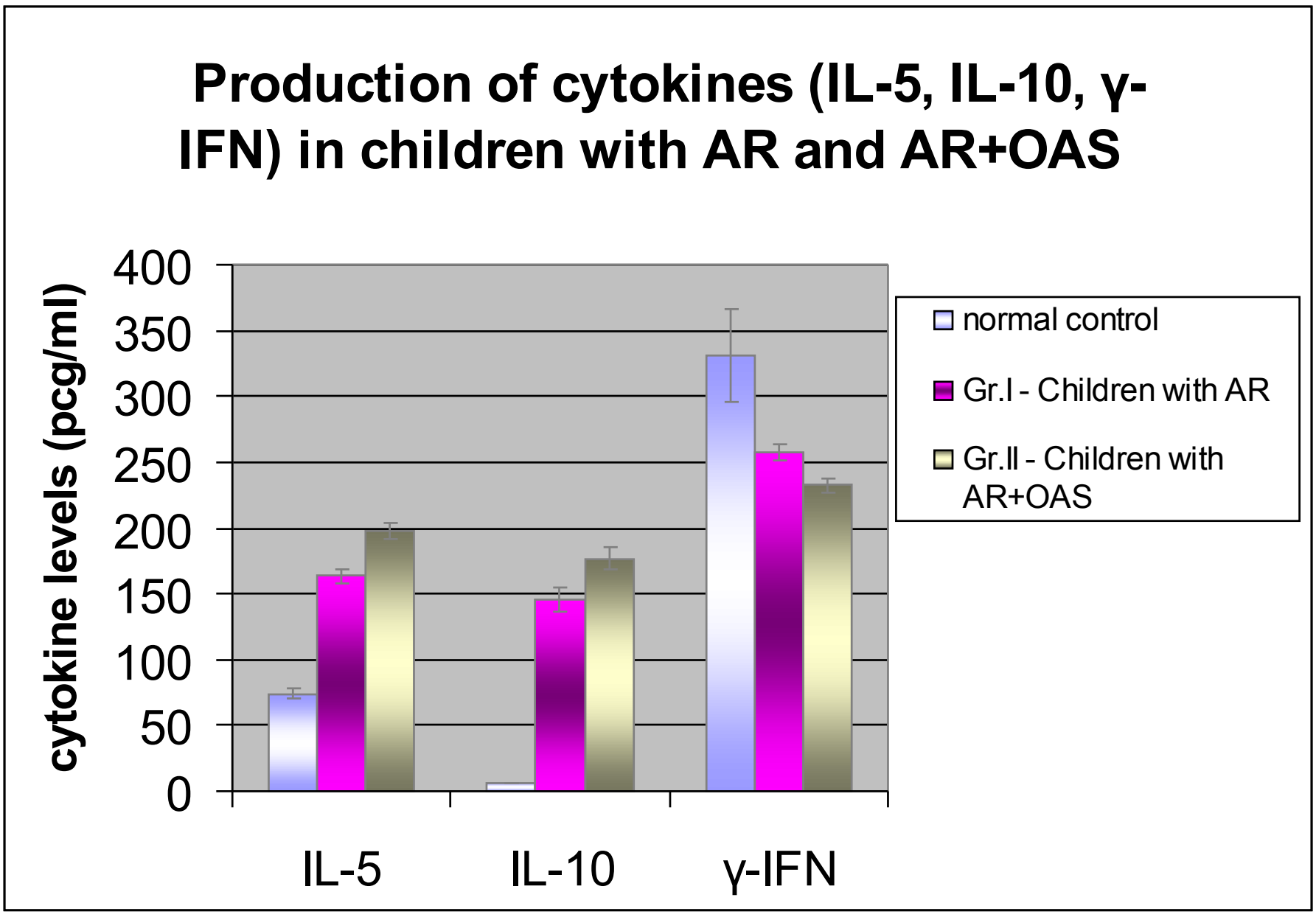
Hazelnut	Apple	Carrot	Peanut
63,4%	37,5%	21,4%	14,3%

Table 3

Cytokines production (pkg/ml)

	IL-5	IL-10	γ-IFN
normal control	74.3±3.3	5.8±0.25	331±35
Children with AR	163.4±5.1	146±9	257.6±6.2
Children with AR and OAS	198.3±6.2	177±8	232.6±5.2

Picture 1


Production of cytokines (IL-5, IL-10, γ-IFN) in children with AR and AR+OAS
cytokine levels (pcg/ml)
400
350
300
250
200
150
100
50
0
IL-5
IL-10
γ-IFN
normal control
Gr.I - Children with AR
Gr.II - Children with AR+OAS