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Analysis of the relations between allergen specific LgG antibody and allergic dermatosis of 14 kinds foods

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Abstract: To use food-specific IgG antibody detection to explore its application in the allergy dermatoses. 181 patients were included from January 2014 to September 2014. Fourteen food-specific IgG antibodies were detected by ELISA. The positive rates of IgG antibody of the patient group and the healthy group were significantly different. The positive rates of IgG antibody of egg, milk, shrimp and crab took a large proportion in three groups of patients with three kinds of allergy dermatoses of urticaria, eczema and allergic dermatitis, the proportion of which was respectively 70.2%, 77.8% and 71.7%. There was mild and moderate intolerance of food in the allergic dermatitis group while there was no distribution difference of food intolerance in urticaria group and eczema group. Among urticaria and allergic dermatitis patients with positive antibody, the positive rate of children was significantly higher than that of adults while there was no significant difference between children and adults among eczema patients with positive antibody. Allergy dermatoses are closely related to food-specific IgG antibody and the allergy dermatoses patients have a high incidence rate of food intolerance; detecting IgG antibody in patients is of great significance for the diagnosis and treatment of allergy dermatoses.

Keywords: food-specific IgG antibody, allergy dermatoses, food intolerance

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1 Introduction

Allergy dermatosis is an inflammatory dermatosis caused by allergic reaction, featuring complicated causes, uncertain pathogenesis and high recurrence rate [1-3]. Allergy dermatoses are mainly caused by allergen, which can lead to inflammatory reaction through ingesting and touching [4,5]. Research [7,8] shows that as many as 40% of people have tolerance against some food to some degrees and food intolerance can cause allergy dermatoses. Meanwhile, clinical data [9] show that IgG antibody detection is closely related to adverse reactions to food and the studies on allergy dermatoses involved in IgG have been paid increasing attention. This test conducted the detection of food-specific IgG antibody in the serum of allergy dermatosis patients to explore its application in allergy dermatoses. Now the report will be stated as follows.

2 Data and methods

2.1 General data

181 allergy dermatosis patients who were diagnosed in dermatological department of our hospital from January 2014 to September 2014 were selected including 98 males and 83 females at the age ranging from 2 months to 73 years old. All the patients include 75 patients with urticaria, 27 patients with eczema and 79 patients with allergic dermatitis. There were also 20 healthy subjects of 11 males and 9 females who participated and had no significant difference on age and gender with patient group.

Ethical approval: The research related to human use has been complied with all the relevant national regulations, institutional policies and in accordance the tenets of the Helsinki Declaration, and has been approved by the authors' institutional review board or equivalent committee.

Informed consent: Informed consent has been obtained from all individuals included in this study.

2.2 Methods

2 ml routine venous blood was collected (Fasting is not necessary). The food intolerance detection kits of BIOMERICA Company of America and the ELISA method were used to detect the specific antibody IgG in 14 kinds of foods including shrimp, crab, cod, beef, pork, chicken, egg, milk, wheat, corn, rice, tomato, soybean and mushroom. On the basis of the result, the standard of mild, moderate and severe can be determined according to the different IgG antibody concentration of different foods. For details see Table 1.

2.3 Statistical method

All the data are input in the form of EXCEL and the statistical software SPSS18.0 is used to analyze these data. Wherein, the count data are tested by Chi-square test and when $p<0.05$, the difference has statistical significance.

3 Result

3.1 Positive rates of IgG antibody of healthy subjects and allergy dermatosis patients

Among 20 healthy subjects, 1 subject tested positive for IgG antibody, which translates to a positive rate was 5.0%. Among 181 patients with allergy dermatoses, 118 patients tested positive for IgG antibody with a total positive rate was 65.2%. There was a significant difference in the positive rate of IgG antibody of healthy group, yet not for the patient group ($X^2=71.8, p<0.05$); See Figure 1. There was no significant difference in the positive rate of IgG antibody among urticaria, eczema and allergic dermatitis groups($p>0.05$). For details see Table 2.

3.2 Positive rate of food-specific IgG of 14 kinds of foods

For the serum of all the subjects, ELISA method was used to detect the food-specific IgG antibody of 14 kinds of foods; for details see Table 3. It was found that among 14 kinds of foods, the positive rate of IgG antibody of egg, milk, shrimp and crab took a large proportion in the three groups of allergy dermatosis patients; wherein, in the group of urticaria, eczema and allergic dermatitis, the proportion of the IgG antibody positive of egg, milk, shrimp and crab in that of the 14 kinds of foods was respectively 70.2%, 77.8% and 71.7%; among the three groups of allergy dermatoses, the positive rates of egg and milk were above 10%. For the sequence of positive rates of IgG antibody of egg, milk, shrimp and crab in the three groups of allergy dermatosis patients see Table 4.

Table 1: Identifying standard of food intolerance.

IgG(U/ml)	Level	Identifying Standard
<50	0	Feminine
50-100	+1	Mild Intolerance
100-200	+2	Moderate Intolerance
>200	+3	Severe Intolerance

Table 2: Comparison of IgG antibody positive rate between healthy group and allergy dermatosis group.

Groups	n	Positive Cases	Positive Rate (%)
Healthy Subjects	20	1	5.0
Urticaria	75	47	62.7
Eczema	27	18	66.7
Allergic dermatitis	79	53	67.1

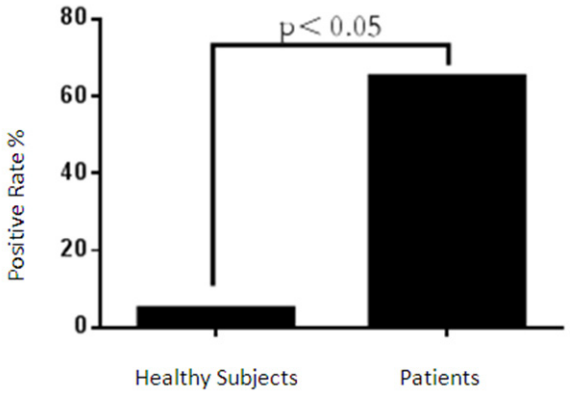

Figure 1: Comparison of IgG antibody positive rate between healthy subjects and patients.

Table 3: IgG antibody positiv rate of 14 kinds of foods in the serum of healthy subjects and allergy dermatosis patients.

Foods	Healthy n (%)		Urticaria n (%)		Eczema n (%)		Allergic Dermatitis n (%)	
Shrimp	1	5.0	6	8.0	4	14.8	5	6.3
Crab	0	0	4	5.3	2	7.4	10	12.7
Cod	0	0	0	0	0	0	3	3.8
Beef	0	0	1	1.3	1	3.7	1	1.3
Chicken	0	0	0	0.0	1	3.7	1	1.3
Pork	0	0	1	1.3	0	0	1	1.3
Egg	0	0	15	20.0	5	18.5	11	13.9
Milk	0	0	8	10.7	3	11.1	12	15.2
Wheat	0	0	1	1.3	1	3.7	4	5.1
Corn	0	0	3	4.0	0	0	2	2.5
Soybean	0	0	4	5.3	0	0	1	1.3
Rice	0	0	2	2.7	0	0.0	3	3.8
Tomato	0	0	2	2.7	0	0	1	1.3
Mushroom	0	0	0	0	1	3.7	0	0

Table 4: Sequence of positive rates of IgG antibody of 4 kinds of foods in the 3 groups of allergy dermatosis.

Groups	1	2	3	4
Urticaria	Egg	Milk	Shrimp	Crab
Eczema	Egg	Shrimp	Milk	Crab
Allergic Dermatitis	Milk	Egg	Crab	Shrimp

Table 5: Positive rates of different food intolerance degrees.

Groups	n	Mild n (%)		Moderate n (%)		Severe n (%)	
Urticaria	47	14	29.8%	19	40.4%	14	29.8%
Eczema	18	6	33.3%	8	44.4%	4	22.2%
Allergic Dermatitis	53	31	58.5%	17	32.1%	5	9.4%

Table 6: Food-specific IgG antibody positive distribution of children and adults.

Groups	≤14 years old n(%)		>14 years old n(%)	
Urticaria	9	19.1%*	38	80.9%
Eczema	10	55.6%$^{\Delta}$	8	44.4%
Allergic dermatitis	12	22.6%*	41	77.4%

*There was a significant difference in comparison with adults group ($p<0.05$); $^{\Delta}$There was no significant difference in comparison with adults group ($p>0.05$)

3.3 Positive Rates of 3 groups of allergy dermatoses in different food tolerance degrees

According to the identifying standard of food intolerance, the mild, moderate and severe positive rates of IgG antibody positive patients of urticaria are respectively 29.8%, 40.4% and 29.8%; those of IgG antibody positive patients of eczema are respectively 33.3%, 44.4% and 22.2%; those of IgG antibody positive patients of allergic dermatitis are respectively 58.5%, 32.1% and 9.4%; for details see Table 5.

3.4 Food-specific IgG antibody positive distribution of children and adults

Among 118 patients, 31 children and 87 adults were tested antibody positive patients. The proportion of children and adults among antibody positive patients with urticaria was respectively 19.1% and 80.9%; the proportion of children and adults among antibody positive patients with eczema was respectively 55.6% and 44.4%; the proportion of children and adults among antibody positive patients with allergic dermatitis was respectively 22.6% and 77.4%; wherein, among antibody positive patients with urticaria, the antibody positive rate of children was significantly below that of adults ($X^2=58.26$, $p=0.031$); among antibody positive patients with allergic dermatitis, the antibody positive rate of children was also significantly below that

of adults (X^2=61.02, p=0.029); among antibody positive patients with eczema, there was no significant difference between children and adults (X^2=25.57, p=0.11). For details see Table 6.

4 Discussion

Allergy dermatosis is caused by allergens, which can lead to its occurrence by various ways [1-3]. Research [4,5] finds that food intolerance can lead to cutaneous inflammation reaction and that IgG antibody is closely related to food intolerance. In this paper, ELISA method was used to detect the different food-specific IgG antibodies in the serum of patients with urticaria, eczema and allergic dermatitis which are the three kinds of common seen allergy dermatoses in clinics, aiming at providing references for the diagnosis of clinical allergy dermatoses.

In this detection result, one of the 20, or 5%, healthy subjects was tested with positive IgG antibody. This rate was lower than that in the reference report [10], which was probably caused by the lack of subjects. Among 181 patients with allergy dermatoses, 118 patients were tested with positive IgG antibody and the total positive rate is 65.2%. There was significant difference compared with healthy group (p<0.05); meanwhile, a comparison was conducted on the different positive rates of IgG antibody of urticaria, eczema and allergic dermatitis and there was no significant difference among these groups of positive rates (p>0.05).

Through detecting the food-specific IgG antibody of 14 kinds of foods, it was found that among 14 kinds of foods, the positive rate of IgG antibody of egg, milk, shrimp and crab took large proportion in the three groups of allergy dermatosis patients; wherein, in the group of urticaria, eczema and allergic dermatitis, the proportion of the IgG antibody positive for egg, milk, shrimp and crab in that of the 14 kinds of foods was respectively 70.2%, 77.8% and 71.7%; among the three groups of allergy dermatoses, the positive rates of egg and milk were above 10% and the moderate intolerance and severe intolerance were mainly found in milk, egg and shrimp, which was similar to that in the literature report [11-13]. Egg was the most intolerant food for urticaria and eczema while milk was the most intolerant food for allergic dermatitis. Among IgG antibody positive patients with urticaria, the mild, moderate and severe positive rates were respectively 29.8%, 40.4% and 29.8%; among IgG antibody positive patients with eczema, the mild, moderate and severe positive rates were respectively 33.3%, 44.4% and 22.2%; among IgG antibody positive patients with allergic dermatitis, the mild, moderate and severe positive rates were respectively 58.5%, 32.1% and 9.4%. The data show that there was mild and moderate food intolerance in the allergic dermatitis group and there was no distribution difference of food intolerance in the urticaria and eczema group.

Among 118 patients, 31 children and 87 adults were tested as antibody positive patients. The proportion of children and adults among antibody positive patients with urticaria was respectively 19.1% and 80.9%; the proportion of children and adults among antibody positive patients with eczema was respectively 55.6% and 44.4%; the proportion of children and adults among antibody positive patients with allergic dermatitis was respectively 22.6% and 77.4%; wherein, among antibody positive patients with urticaria, the antibody positive rate of children was significantly below that of adults (p<0.05); among antibody positive patients with allergic dermatitis, the antibody positive rate of children was also significantly below that of adults (p<0.05); among antibody positive patients with eczema, there was no significant difference between children and adults (p>0.05). The data show that allergy dermatosis of adults was different from that of children; wherein, adult patients with urticaria and allergic dermatitis were more numerous than child patients. Child patients with eczema were more than adult patients, which were different from that in the literature report and probably caused by the lack of eczema subjects, as stated earlier.

To sum up, allergy dermatoses are closely related to food-specific IgG antibody and the allergy dermatoses patients have a high incidence rate of food intolerance; detecting IgG antibody in the serum of patients is of great significance for the diagnosis and treatment of allergy dermatoses.

Conflict of interest statement: Authors state no conflict of interest.

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