The Importance of Food Open Challenge Test in Atopic Dermatitis:

The Comparison of Allergy History, Skin-Prick Test, and Specific IgE Detection

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ABSTRACT

Food allergies play an important role in Atopic Dermatitis (AD). Dietary manipulation is essential in the management of AD. However, there has been a paucity of data reporting the prevalence of food allergies in AD patients in Korea. In this study, the Food Open Challenge Tests (FOCT) were conducted to investigate food allergies in AD patients. The skin-prick test and the detection of specific IgE, as well as allergy history of patient were used to detect food allergies in all AD patients. Elimination diet was conducted for two weeks prior to FOCTs. The prevalence of food allergies by FOCT is as follows: milk (67.3%); chicken (64.2%); pork (62.8%); eggs (61.0%); beef (55.4%); wheat (52.0%) and soybean (45.2%). Allergenic food items in Korean AD patients were different from people in other foreign countries. The seven major foods those tested positively by FOCTs were completely eliminated from the replaced diets for two weeks, and were subsequently reintroduced one at a time. Results from FOCTs were not comparable with allergy history or skin-prick tests or specific IgE detection. The sensitivity and specificity of skin-prick tests and specific IgE detection were lower than FOCTs. Allergy history, skin-prick tests, and specific IgE detection are useful for the identification of food allergen but its clinical significance differed according to food items. Therefore, we conclude that even though a 10-day delay was necessary after food challenge, FOCT is a useful and valid method to confirm food allergies and may be essential for the effective control of food allergies for treatment of AD.

KEY WORDS: Food allergies, food open challenge tests, atopic dermatitis.

INTRODUCTION

There are many reports about the roles of food allergies in Atopic Dermatitis (AD).[1] The first principle for treating of allergic disease is to avoid allergen.[2] Dietary manipulation is essential in the management of AD.[3] Currently, there are several common methods to identify food allergens, including the skin-prick test, and the detection of specific IgE. The main problems are the low sensitivity and specificity of skin-prick tests and the detection of specific IgE.[4] The double-blinded placebo-controlled food challenge (DBPCFC) test is the only convincing one to identify food allergies.[5] However, it is very difficult to perform DBPCFC test in clinical fields. Other methods, such as the Food Open Challenge Test (FOCT)[6] and the Labial Challenge Test,[7] have been tried. Little data is available concerning the prevalence of food allergies based on the results of these challenge tests.[8] Most data were based on the results of the skin-prick test and specific IgE.[9,10]

In this study, the FOCTs were conducted to investig-
ate food allergies in AD patients. The skin-prick test and the detection of specific IgE, as well as allergy history were used to detect food allergies in all AD patients. To confirm food allergies, FOCTs were conducted on AD patients. FOCTs were performed serially, according to protocol. The prevalence of food allergies in AD was studied. The sensitivity, specificity, positive predictive value and negative predictive value of the skin-prick test and the detection of specific IgE, as well as allergy history of patient about seven major food allergen items were evaluated to investigate the clinical significance of those tests.

MATERIALS AND METHODS

1. Patients and study design

A total of 524 AD patients who visited the Atopic Dermatitis Clinic at Samsung Cheil Hospital from May 1, 1997 to December 31, 1998 were enrolled in the study. They fulfilled the criteria of Hanifin and Rajzka,[11] and had suffered from AD for at least 6 months. Dermatitis problems ranged from mild to severe. A detailed history was obtained, with special attention to food intake, and its possible relation to exacerbating AD.

Grading the clinical severity of AD was assessed using Hanifin and Rajzka scoring system.[11] Total clinical severity score of fifteen consisted of the sum of five individual scores: Pruritus, Erythema, Edema/Papulation, Excoriation and Scaling/Dryness. Each was graded as either 0 (none), 1 (mild), 2 (moderate), or 3 (severe). Systemic steroids or other medications were tapered off and withheld for at least one month prior to beginning the study. Only a topical steroid application of 1% hydrocortisone was allowed. Upon starting the study, a detailed, medical history and physical examinations were obtained. Allergy history in all patients were carefully noted by a clinical dietitian. No patient had any convincing history of major anaphylactic or anaphylactoid reaction.

2. Skin-prick test

Skin-prick tests were conducted to the backs of patients with commercially available 58 food allergens (Torii pharm. Co., Ltd, Tokyo, Japan: Bencard, Brentford, England)(Table 3). Histamine hydrochloride 1 mg/ml (Bencard, 1 Brentford, England) was used as a positive control. Physiologic saline and distilled water were the negative control. Reactions were read after 15 minutes and classified as either negative (0: no reaction, 1+: reaction greater than control reaction, but smaller than half the size of histamine reaction). Positive reactions were graded as follows: 2+: half the size, 3+: equal, 4+: twice as large as the size of histamine reaction. The minimum size of positive reaction was 3 mm.

3. MAST and FAST for specific IgE

All patients were tested using the Multiallergen-Sorbent-Test (MAST) and the Fluorescent Allergy-Sorbent-Test (FAST) for the identification of specific IgE of food allergens. The test allergens were the same as those used in the skin-prick tests. MAST and skin-prick tests were performed routinely. The allergen items positive in the skin-prick test and absent in the items of MAST, were compensated by FAST. The MAST assay was in accordance with the manufacturer's instructions. Concentration of allergen-specific IgE was expressed in the MAST class units or net voltages, as defined in the MAST product inserts. MAST results were classified from 0 to 4+ ($<$0.06 V $= 0$; 0.06-0.67 V $= 1+$: 0.67-1.90 V $= 2+$: 1.90-3. 50 V $= 3+$: $>$3.50 V $= 4+$). Results of 0 and 1+ were recorded as negative. FAST was performed following strictly the manufacturer's instructions (Allergenetics form 146, December 1982). As proposed by the manufacturer, results were graded in the following classes: 0 ($<$0.02

IU/ml, very low levels or below detection), 1 (0.02-0.1 IU/ml or equivocal), 2 (0.1-0.5 IU/ml), 3 (0.5-2.5 IU/ml), 4 (2.5-12.5 IU/ml), 5 (12.5-62.5 IU/ml) and 6 ($>$ 62.5 IU/ml). Classes two to six indicate increased levels of allergen specific IgE.

4. Elimination diet with replacement diet and food open challenge test (FOCT)

Patients were asked to eliminate the suspected foods according to the results of allergy history, skin-prick test, and specific IgE detection (primary elimination, maximal elimination phase) (Fig. 1). Replacement diets to substitute for the foods to be eliminated were supplied during the entire elimination diet period for balanced nutrition (Table 1). To confirm the complete elimination of all foods identified as allergens, diet records of all patients were analyzed by dietitian.

FOCTs were performed according to the following indications: 1) Obvious clinical improvement (reduction of clinical severity scores 20% above initial score) was obtained, and the patient's clinical status was stable for at least two weeks. 2) Allergens planned to be tested were completely eliminated in foods, confirmed by the analysis of the diet records by a dietitian.

FOCTs were conducted in two steps (Fig. 2) by gradually increasing the amount day by day (Table 2). Patients consumed the foods once per day in the morning. After three days of the first FOCT, the clinical results of the test and the severity score were evaluated. If patients showed an increase in the clinical severity scores of more than 20% above starting scores, or an obvious aggravation of clinical symptoms or signs, the tests were stopped and results were recorded as being positive. Otherwise, FOCTs were continued with increased quantities of challenged food for another seven days. If patients showed ag-
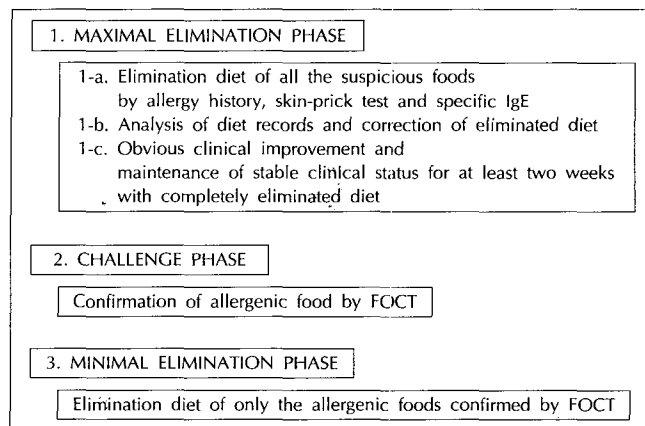


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┌─────────────────────────────────────────────────────┐
│  1. MAXIMAL ELIMINATION PHASE                        │
│  ┌────────────────────────────────────────────────┐ │
│  │ 1-a. Elimination diet of all the suspicious    │ │
│  │      foods                                     │ │
│  │      by allergy history, skin-prick test and   │ │
│  │      specific IgE                              │ │
│  │ 1-b. Analysis of diet records and correction   │ │
│  │      of eliminated diet                        │ │
│  │ 1-c. Obvious clinical improvement and          │ │
│  │      maintenance of stable clinical status     │ │
│  │      for at least two weeks                    │ │
│  │    . with completely eliminated diet           │ │
│  └────────────────────────────────────────────────┘ │
│                                                      │
│  2. CHALLENGE PHASE                                  │
│  ┌────────────────────────────────────────────────┐ │
│  │ Confirmation of allergenic food by FOCT        │ │
│  └────────────────────────────────────────────────┘ │
│                                                      │
│  3. MINIMAL ELIMINATION PHASE                        │
│  ┌────────────────────────────────────────────────┐ │
│  │ Elimination diet of only the allergenic foods  │ │
│  │ confirmed by FOCT                              │ │
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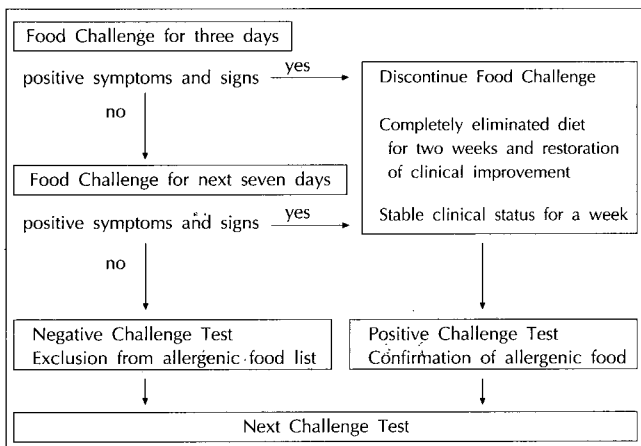
Fig. 1. Diagram of selective food elimination

Fig. 2. Flowchart of food open challenge test (FOCT).

Table 1. Eliminated food & replaced food

Eliminated food	Replaced food	Food product
Wheat	Rice	Rice, Glutinous rice Rice cake, etc.
	Potato	Potato, Potato starch, etc.
Soybean	Seaweed	Laver, Sea mustard Sea tangle, Sea lettuce, etc.
	Dried fish	Anchovy boiled-dried, Icefish dried strip, etc.
	Vegetable	Red pepper leaves, Radish leaves, Mustard leaves, etc.
Beef	Fish	Mackerel, Cod, Herring Tuna, etc.
Pork	Beef	Beef Mackerel. Cod, Herring Tuna, etc.
Chicken	Beef	Beef
	Fish	Mackerel, Cod, Herring Tuna, etc.
Mackerel	Fish	Salmon, Cod, Herring Tuna, etc.
Eggs	Soybean	Soybean curd, Unpressed soybean curd Soybean sprout, etc.
Milk	Soybean	Soybean milk
Sesame	Oil	Olive oil, Corn oil, Soybean oil, etc.

gravated symptoms, FOCTs were delayed until patients recovered to the pre-testing state. When patients consumed the foods that were to be eliminated during the study, the FOCTs were stopped and patients were observed for one week. A negative test was followed by a single-blind FOCT. Thereafter, only positive foods were completely eliminated.

Table 2. Units of food increase in Food Open Challenge Test

Test food	Food products	1 portion	Increase (g)
Wheat	Noodle	90g (1/2 cup)	90, 180, 270
	Bread	35 g (1 slice)	35, 70, 105
Soybean	Soybean curd	80 g	80, 160 240
	Soybean milk	100 ml	100, 200, 400
Meat	Beef, pork, Chicken	40 g	40, 80, 120
Mackerel	Mackerel	50 g	50, 100, 150
Eggs	Eggs	50 g (one)	50, 100, 150
Milk	Milk	100 ml	100, 200, 400
Sesame	Sesame oil &	1 ts	1ts, 2ts, 3ts
	Sesame seeds	1 ts	1ts, 2ts, 3ts
Chocolate	Chocolate	20 g	20, 40, 60

5. Statistical descriptions

Data were shown as mean standard deviation. The sensitivity, specificity, positive predictive value, and negative predictive value of allergy history, the skin-prick tests, and specific IgE detection, were also calculated by comparing the results of FOCTs.

RESULTS

1. Clinical results, allergy history, skin-prick test, and specific IgE

Among 524 AD patients, 316 (60.3%) showed clinical improvement with the reduction of clinical severity scores over 20% of initial scores (from 6.9 ± 3.6 to 4.9 ± 3.5, p < 0.01) by elimination diet. When food items for elimination diet were reduced according to the results of FOCTs for four weeks, clinical severity score was 5.0 ± 3.7.

The positive ratios of allergy history, skin-prick tests, and specific IgE detection were different from another. Average positive allergenic food counts to total of 58 items were 2.1 ± 1.8 (3.6 ± 3.0%) by allergy history, 17.2 ± 9.2 (29.6 ± 15.9%) by skin-prick tests, and 5.9 ± 4.8 (10.1 ± 8.3%) by the detection of specific IgE.

Table 3 shows the percentage and positive count of AD patients by allergy history, skin-prick tests and specific IgE detection. The common allergenic foods to which over 10 % of patients showed allergies by allergy history were four items as follows: chicken (22.5%); pork (21.0%); eggs (16. 2%) and milk (11.8%). Among 58 food items, 91.4% (53 items) showed positive results in over 10% of patients by skin-prick tests. The most frequent positive foods to which over 50% of patients showed positive results by skin-prick tests, were eight items as follows: tuna (68.3%); wheat (67.9%); shrimp (56.7%); mushroom (55.7%); milk (53. 6%); lobster (52.3%); clam (51.5%) and beef (50.0%). By

Table 3. Percentage and positive count of atopic dermatitis patients by allergy history, skin-prick tests and specific IgE detection

Allergy history		Skin-prick test		Specific IgE	
Foods	% (positive count)	Foods	% (positive count)	Foods	% (positive count)
Chicken	22.5 (118)	Tuna	68.3 (358)	Milk	29.4 (154)
Pork	21.0 (110)	Wheat	67.9 (356)	Eggs	26.7 (140)
Eggs	16.2 (85)	Shrimp	56.7 (297)	Soybean	22.7 (119)
Milk	11.8 (62)	Mushroom	55.7 (292)	Beef	19.1 (100)
Mackerel	9.2 (48)	Milk	53.6 (281)	Pork	18.7 (98)
Tomato	8.8 (46)	Lobster	52.3 (274)	Crab	16.2 (85)
Peach	4.6 (24)	Clam	51.5 (274)	Chicken	14.7 (77)
Crab	4.4 (23)	Beef	50.0 (262)	Shrimp	13.0 (68)
Clam	2.7 (14)	Eggs	48.5 (254)	Wheat	11.8 (62)
Shrimp	2.7 (14)	Chocolate	47.9 (251)	Peach	9.2 (48)
Soybean	2.5 (13)	Cod	47.5 (249)	Cheese	9.0 (47)
Beef	2.1 (11)	Peanuts	46.4 (243)	Tuna	6.9 (36)
Chocolate	2.1 (11)	Sesame	46.4 (243)	Cod	6.7 (35)
Wheat	2.1 (11)	Lettuce	45.8 (240)	Peanuts	6.3 (33)
Cheese	1.9 (10)	Cheese	43.3 (227)	Yeast	6.1 (32)
Malt	1.5 (8)	Celery	43.3 (227)	Rye	5.2 (27)
Melon	1.5 (8)	Tomato	42.4 (222)	Onion	5.0 (26)
Tuna	1.5 (8)	Oyster	40.6 (213)	Tomato	4.8 (25)
Orange	1.3 (7)	Pork	39.9 (209)	Chocolate	4.8 (25)
Walnut	1.1 (6)	Crab	39.5 (207)	Barley	4.2 (22)
Peanuts	1.0 (5)	Yeast	39.1 (205)	Almond	4.2 (22)
Apple	0.8 (4)	Spinach	38.7 (203)	Hazelnut	3.8 (20)
Herring	0.8 (4)	Almond	38.2 (200)	Apple	3.8 (20)
Strawberry	0.8 (4)	Chicken	37.2 (195)	Celery	3.8 (20)
Almond	0.4 (2)	Rye	36.6 (192)	Lemon	3.4 (18)
Banana	0.4 (2)	Cabbage	36.5 (191)	Orange	3.1 (16)
Lamb	0.4 (2)	Barley	36.1 (189)	Carrot	3.1 (16)
Onion	0.4 (2)	Coffee	34.4 (180)	Rice	2.7 (14)
Oyster	0.4 (2)	Parsley	33.6 (176)	Corn	2.7 (14)
Lobster	0.4 (2)	Hazelnut	32.8 (172)	Banana	2.7 (14)
Yeast	0.4 (2)	Lamb	32.1 (168)	Peas	2.5 (13)
Carrot	0.2 (1)	Salmon	31.9 (167)	Grape	2.5 (13)
Cod	0.2 (1)	Malt	31.1 (163)	Potato	2.5 (13)
Coffee	0.2 (1)	Mussel	29.2 (153)	Garlic	2.5 (13)
Garlic	0.2 (1)	Tea	29.2 (153)	Walnut	2.3 (12)
Grape	0.2 (1)	Grape	28.2 (148)	Spinach	2.3 (12)
Peas	0.2 (1)	Potato	27.3 (143)	Salmon	1.9 (10)
Plaice	0.2 (1)	Peach	26.9 (141)	Cabbage	1.9 (10)
Salmon	0.2 (1)	Peas	26.7 (140)	Strawberry	1.7 (9)
Sesame	0.2 (1)	Lemon	26.7 (140)	Parsley	1.5 (8)
Spinach	0.2 (1)	Mixed beans	26.3 (138)	Lobster	1.2 (6)
Barley	0 (0)	Onion	26.3 (138)	Lamb	0.6 (3)
Cabbage	0 (0)	Carrot	25.8 (135)	Mackerel	0.4 (2)
Celery	0 (0)	Strawberry	25.6 (134)	Clam	0.4 (2)
Corn	0 (0)	Banana	25.2 (132)	Mushroom	0.4 (2)
Hazelnut	0 (0)	Plaice	24.6 (129)	Sardine	0.2 (1)
Lemon	0 (0)	Herring	24.0 (126)	Plaice	0.2 (1)
Lettuce	0 (0)	Sardine	24.0 (126)	Mussel	0.2 (1)
Mixed beans	0 (0)	Soybean	23.1 (121)	Oyster	0.2 (1)
Mushroom	0 (0)	Apple	22.9 (120)	Garlic	0.2 (1)
Mussel	0 (0)	Walnut	22.1 (116)	Coffee	0.2 (1)

Table 3. Continued

Allergy history		Skin-prick test		Specific IgE	
Foods	% (positive count)	Foods	% (positive count)	Foods	% (positive count)
Parsley	0 (0)	Orange	21.8 (114)	Mixed beans	0 (0)
Pear	0 (0)	Mackerel	20.8 (109)	Herring	0 (0)
Potato	0 (0)	Rice	6.5 (34)	Melon	0 (0)
Rice	0 (0)	Corn	0 (0)	Pear	0 (0)
Rye	0 (0)	Melon	0 (0)	Sesame	0 (0)
Sardine	0 (0)	Pear	0 (0)	Malt	0 (0)
Tea	0 (0)	Garlic	0 (0)	Tea	0 (0)

specific IgE detection, common allergenic foods to which over 10% of patients showed positive results, were nine items as follows: milk (29.4%); eggs (26.7%); soybean (22.7%); beef (19.1%); pork (18.7%); crab (16.2%); chicken (14.7%); shrimp (13.0%) and wheat (11.8%).

2. Food open challenge test

FOCTs were conducted on 316 AD patients who responded to the elimination diet with clinical improvement of over 20% of initial score, as described above. FOCTs were conducted with average of 2.8 items per each patient (ranging from 1 to 10 foods). A total of 897 FOCTs were conducted. Five hundred and fifty eight of those (62.2%) were positive, showing pruritus, scaly changes, or papular eruption. Milk, eggs, chicken, pork, beef, soybean, and wheat were tested, regardless of the results of skin-prick tests and the detection of specific IgE. Prevalence of food allergies by FOCT in AD is as follows: milk (67.3%), chicken (64.2%), pork (62.8%), eggs (61.0%), beef (55.4%), wheat (52.0%) and soybean (45.2%).

3. Comparison of results of FOCTs with the result of allergy history, skin-prick test, and specific IgE

To evaluate the usefulness of allergy history, skin-prick test and specific IgE detection, statistical description such as sensitivity, specificity, positive predictive value, and negative predictive value were analyzed in patients who received FOCTs (Table 4). The statistical description varied according to food items or the methods of tests.

DISCUSSION

In 60.3% of AD patients, elimination diet improved the clinical severity scores. In other reports, 72% of AD patients had food allergy[12] and 38.7% of patients had positive results via FOCTs.[13] Allergy history and the detecti-

Table 4. Comparison of allergy history, skin-prick tests and specific IgE detection with Food Open Challenge Test in Atopic Dermatitis

	Sensitivity (%)[1]	Specificity (%)[2]	PPV (%)[3]	NPV (%)[4]
Milk				
Allergy history	20.0	80.0	66.7	33.3
Skin-prick test	48.7	62.5	72.7	37.2
Specific IgE	56.9	41.4	68.5	30.0
Chicken				
Allergy history	30.0	86.2	75.0	47.2
Skin-prick test	32.0	87.0	81.6	41.6
Specific IgE	32.8	75.0	73.1	35.0
Pork				
Allergy history	35.9	71.4	70.0	37.5
Skin-prick test	30.2	84.3	76.5	41.7
Specific IgE	63.3	47.8	72.1	37.9
Eggs				
Allergy history	32.5	79.2	72.2	41.3
Skin-prick test	38.4	67.3	64.7	41.1
Specific IgE	61.5	63.6	72.7	51.2
Beef				
Alllergy history	–	–	–	–
Skin-prick test	87.1	20.0	57.4	55.6
Specific IgE	47.8	35.3	50.0	33.3
Wheat				
Allergy history	–	–	–	–
Skin-prick test	92.6	16.0	54.3	66.7
Specific IgE	28.6	61.5	44.4	44.4
Soybean				
Allergy history	–	–	–	–
Skin-prick test	85.7	11.8	44.4	50.0
Specific IgE	100.0	30.0	50.0	100.0

1) Sensitivity = percentage of positive counts by test in total positive counts by Food Open Challenge Test
2) Specificity = percentage of negative counts by test in total negative counts by Food Open Challenge Test
3) PPV: positive predictive value = percentage of positive counts by Fo-od Open Challenge Test in total positive counts by test
4) NPV: negative predictive value = percentage of negative counts by Food Open Challenge Test in total negative counts by test

on of specific IgE showed relatively similar results to those of FOCTs. However, there were differences between the results of skin-prick test and FOCTs.

In a study of skin-prick tests, 91.4% of items (53 of 58) showed positive reaction in over 10% of AD patients. Skin-pick tests were positive in 40% of cases with commercial extracts.[14] Moreover, positive food items by skin-prick test were different from those by FOCTs. Skin-prick tests and specific IgE detection were reported as being less helpful because of the high rates of false-positive[15] and false-negative.[9] Also, the reliability of skin-prick test and specific IgE to identify food allergies have been investigated in comparison with the results of FOCTs.[4][10][15] These two methods were not sufficient enough to identify food allergies in AD. The modification or combinations of several

tests were tried for the enhanced identification of food allergies in AD.[4] The concordance rate between positive prick tests and positive challenges was 58.8% for eggs and cow's milk in the report.[4] Concordance rate was up to 61.9% for eggs and 65.3% for milk.[12] By allergy history, mean positive rate per patient was so low, just 3.6 ± 3.0 %. This data means not only that allergy history could not give enough information to control food allergies compared to the results of FOCTs, but also that patients did not accurately know their food allergies. Although the results of allergy history, skin-prick tests, and the identification of specific IgE were not accurate, FOCTs showed the efficient identification of food allergies when it performed according to the results of allergy history, skin-prick tests, and the identification of specific IgE (Table 4). Also, elimination diet following the results of these three tests, was effective.

The statistical parameters were different according to the food items and test methods (Table 4). For wheat, beef and soybean, skin prick tests were important to identify food allergies (sensitivity = 92.6% in wheat, 87.1% in beef, 85.7% in soybean). For pork, chicken, eggs, and milk, the sensitivity of skin prick test was so low, that one must be cautious to apply the results clinically. Specific IgE was important to identify soybean allergies (sensitivity = 100% in this study). For pork, eggs and milk, the sensitivities of the identification of specific IgE were over 50% with relatively significant results. However for chicken, it was difficult to predict allergies by allergy history, skin-prick tests, and the identification of specific IgE. It is recommended to try FOCTs for chicken.

Prevalence of food allergies in products such as milk, chicken, pork, eggs, beef, wheat, and soybean were higher than expected. Interestingly, these frequent allergenic food items were different from other reports. Eggs, milk, peanuts and soy accounted for 87% of confirmed reaction.[12] Seven foods (milk, eggs, peanuts, soy, wheat, cod/catfish, cashew) were reported to account for 89% of the positive challenges.[13] The prevalence of milk allergies was higher as 67.3% than 54% in a previous report.[4] These differences in allergenic food items might be caused from the different lifestyles in different countries which the studies were performed.

In many reports, an immediate reaction was observed resulting from the FOCT.[16][17] There remains controversy about the existence of delayed reaction to foods. Delayed reactions were notable.[6][18] Therefore, it is recommended to observe patients for at least ten days to decipher the results of FOCTs. In this study, the clinical reactions pro-

voked by FOCTs persisted for more than ten days after discontinuing FOCTs. The next FOCT would likely be conducted after two weeks, when patients showed positive challenge in previous test.

From our results, FOCTs are valid and effective modality to confirm food allergies. A properly performed, double-blinded placebo-controlled food challenge (DBPCFC) test has been known to be the only accepted test for the confirmation of diagnosis of adverse reactions to food.[5][19] However, it is difficult to perform in the clinical field. A Labial Food Challenge Test was tried, and the sensitivity was 77%.[7] A Colonoscopic Allergen Provocation Test was also tried.[20] For clinical practice, FOCT may be relatively easy and simple. In our study, the clinical improvement was induced and maintained in AD patients when patients kept elimination diet, and reduced food items, according to the results of FOCT. Consequently, FOCTs were valid and useful, if the process was performed properly.

CONCLUSION

Conclusively, allergenic food items were different in Korean Atopic Dermatitis patients compared to those in other countries. The clinical significance of allergy history, skin-prick tests, and the identification of specific IgE, varied according to food items. Allergy history, skin-prick tests, and specific IgE detection are useful methods for the identification of food allergies. However, the sensitivity and specificity of these tests were lower than those of FOCTs. Therefore, even though it is necessary to examine the delayed reaction until ten days after food challenge, FOCTs were valid and useful in confirming food allergies and may be essential for the effective control of food allergies as a modality for the treatment of Atopic Dermatitis.

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