The Prevalence Of Igg-Mediated Food Intolerance And The Most Common Types Of Food Among Thai Patients With Chronic Adult Acne

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Abstract

BACKGROUND: Serum testing for IgG-mediated food intolerance is popular as an important component of clinical diagnosis and treatment in integrative medicine practice in Thailand.

OBJECTIVES: To assess the prevalence of food-specific IgG antibodies and determine the most common type of food allergy among adult patients with chronic acne.

METHOD: This was a cross-sectional study conducted at a dermatology clinic in Bangkok, Thailand between 2016 and 2020.

SETTING: S-Mart Clinic (Anti-Aging and Wellness Center), Bangkok, Thailand (2016-2020).

PATIENTS AND METHODS: This study included all patients who underwent serum testing for food-specific IgG antibodies between the years 2016 and 2020.
MAIN OUTCOME MEASURE(S): Frequencies and median titers of each type of food-specific IgG antibody in all patients.
RESULTS: A total of 299 patients were tested for food-specific IgG antibodies at the S-Mart Clinic between 2016 and 2020. The most common indications were chronic adult acne (103 patients, 34.4%) and chronic skin eruptions (105 patients, 35.1%). Among the patients, 237 (79.26%) were female, and 62 (20.74%) were male, with a mean age of 39.2 (+13.7) years. The most common types of food-specific IgG antibodies, with median titers above 23 U/ml, were cola nut (96.0% of patients, median titer = 53 U/ml), barley (92.3%, 49 U/ml), egg white (91.6%, 76 U/ml), Brewer's yeast (85.6%, 49 U/ml), cow's milk (85.3%, 82 U/ml), corn/maize (82.9%, 45 U/ml), pea (77.3%, 50 U/ml), pistachio (74.2%, 38 U/ml), wheat (73.9%, 33 U/ml), sheep's milk (70.9%, 47 U/ml), casein, plum, and red kidney bean (69.9%, 64, 30, 33 U/ml), white haricot bean (65.9%, 34 U/ml), goat milk (60.2%, 36 U/ml), aloe vera (59.5%, 27 U/ml), cashew nut (55.6%, 26 U/ml), and almond (50.8%, 24 U/ml). The ranking of median titers for each type of food-specific IgG antibody correlated with their frequencies, except for cow's milk (median titer = 82 U/ml), egg white (76 U/ml), and casein (64 U/ml), which had the highest median titers. The patterns of food types, frequencies, rankings, and median titers were consistent across all cases, the acne group, and the non-acne group.
CONCLUSION: The most common indications for patients tested with food-specific IgG antibodies in this study were chronic adult acne and chronic skin eruptions. There were no statistically significant differences in the types of food, frequencies, rankings, and median titers among all cases, the acne group, and the non-acne group.
LIMITATIONS: The data is limited to a single anti-aging clinic in Thailand and may not be representative of the entire practice in the country. Follow-up studies could not be conducted due to incomplete follow-up data, which prevented the assessment of the effects of eliminating these foods from the diet.

Keywords— IgG-mediated Food Intolerance, Specific IgG antibodies, chronic adult acne. Food Intolerance, Food hypersensitivity, Immunoglobulin G, Food Allergy,

I. INTRODUCTION

The concept of gut dysfunction has gained attention in integrative or functional medicine over the past few decades [1]. IgG food allergy or food intolerance is a significant aspect of gut dysfunction [2,3,4]. Serum testing for IgG-mediated food intolerance has become increasingly popular as an essential component of clinical diagnosis and treatment for many individuals with suspected conditions. These patients commonly exhibit symptoms like chronic adult acne, chronic dermatitis, eczema, as well as gastrointestinal issues such as chronic irritable bowel syndrome, chronic abdominal bloating, constipation, diarrhea, and GERD. Additionally, they may experience other symptoms including insomnia, fatigue, obesity, and various autoimmune diseases [5,6,7]. Despite the absence of clear standardization for this investigation and treatment, the diagnostic test's popularity continues to grow [8,9]. Moreover, the cost of this diagnostic test is relatively high compared to conventional tests.

The term "food allergy" encompasses reactions to specific foods that can result in a range of symptoms affecting various organ systems, including the gut and brain, beyond typical allergy symptoms. Any form of skin inflammation or other systemic inflammation should be regarded as potentially significant. IgG food allergy occurs when incompletely digested food peptides leak through a compromised intestinal epithelial barrier, stimulating Peyer's patches, which are the largest immune system component in the body. It is worth noting that there is limited discussion in dermatological literature regarding an important immune mechanism—cross-reactive T cell reactions to certain foods, such as milk products, as a cause of acne [10].

II. OBJECTIVES

The objective of this study is to investigate the prevalence and common types of IgG food allergies in patients with chronic

adult acne or other related conditions who have undergone this diagnostic test. The results of this study can provide valuable insights for future research on the efficacy of the test and can also serve as a point of reference for patients who are unable to afford this particular diagnostic test.

III. MATERIAL AND METHODS

A. Study Population

The study population consisted of patients who presented to the clinic and underwent food-specific IgG antibody testing, starting in January 2016. Participation in the study was voluntary, and individuals aged 6-81 years were included. The concentration of serum IgG that reacted with 222 commonly consumed foods in Thailand was measured in these individuals. By December 2020, a total of 299 participants were included after excluding those with incomplete data. Baseline information, such as age, sex, and chief complaints or symptoms of each patient, was collected from the OPD cards. The study protocol was approved by the Institutional Review Board of Dhurakij Pundit University (COA No. 055/63), Bangkok, Thailand.

B. Food-specific Serum IgG Assay

The serum of participants was collected and sent to authorized hospital laboratories (NHealth). All samples were quantified for food-specific antibodies using the Genarrayt™ 200+ Food IgG kit (Cambridge Nutritional Sciences, UK) [11]. This test kit is rapid colorimetric microarray-based ELISA for the measurement of IgG antibodies. A total of 222 foods were microarrayed in duplicate onto a nitrocellulose pad on a glass microscope slide. Before incubation with 1:49 diluted participant serum (by adding 5 µl serum to 245 µl sample diluent) for 30 minutes, non-specific binding sites were blocked with a blocking buffer. During the incubation period, specific antibodies to the food extracts applied to the nitrocellulose pad bind to the corresponding food. Unbound serum components are washed away, and anti-human IgG conjugated to horseradish peroxidase is added for the second incubation, binding to the food extract-bound antibodies. After washing to remove unbound conjugate, a solution containing 3,3’,5,5’-tetramethylbenzidine (TMB) and enzyme substrate is added to

trace specific antibody binding. Following washing with distilled water, the slide is dried through centrifugation before scanning. The optical densities of the standards, positive and negative controls, and samples are measured using a high-resolution flatbed scanner with associated software. The optical density is directly proportional to the antibody activity in the sample.

Food-specific IgG antibodies from each type of food will be reported in U/ml. If the level of IgG antibodies below 24 U/ml, it means negative response. That particular food is suggested not to be eliminated. If the level of IgG antibodies is between 24-30 U/ml, it means borderline response. This food is suggested to be eliminated for 1-3 months. Finally, if the level of IgG antibodies is above 30 U/ml, it indicates a positive response. This food is suggested to be eliminated for 3-6 months [12].

C. Statistical Analysis

All data were entered into a Microsoft office Excel database, followed by automatic check and verification. Discrete variables are summarized using frequencies and percentages. Due to the skewed distribution of the data, serum concentrations of food-specific IgG antibodies were reported as median titers. To visualize the distribution of each food-specific IgG concentrations in all subjects and subgroups (chronic adult acne and chronic skin eruption group), bar charts or line graphs were generated. Pearson's chi-square test was used to compare the frequencies of each type of food across all three groups, while the Kruskal-Wallis test was used to compare the median titers.

IV. RESULTS

All reports of food-specific IgG antibody measurements using FoodPrint™ from patients at S-Mart Clinic between January 2016 and December 2020 were collected retrospectively and analyzed as a descriptive study, as shown in Table 1.

TABLE I. BASELINE CHARACTERISTICS OF PATIENTS TESTED WITH IGG-MEDIATED FOOD INTOLERANT TEST DURING 2016-2020 (COMPARISON BETWEEN ALL CASES, ACNE CASES AND NON-ACNE CASES)

	All cases (n=299)	**Acne cases** (n=103)	**Non-acne cases** (n=196)
Sex			
Female	237 (79.3%)	86 (83.5%)	151 (77.0%)
Male	62 (20.7%)	17 (16.5%)	45 (23.0%)
Age	39.2 (+13.7)	33.7 (+9.6)	42.1 (+14.6)
< 20 years old	13 (4.4%)	4 (3.9%)	9 (4.6%)
20-29 years old	67 (22.4%)	36 (35.0%)	31 (15.8%)
30-39 years old	80 (26.8%)	35 (34%)	45 (23.0%)
40-49 years old	74 (24.8%)	20 (19.4%)	54 (27.6%)
50-59 years old	38 (12.7%)	8 (7.8%)	30 (15.3%)
> 60 years old	27 (9.0%)	0 (0%)	27 (13.8%)
Symptoms (indication to do test)			
Chronic acne	103 (34.5%)	103 (100%)	0 (0.0%)
Chronic skin eruptions	105 (35.1%)	20 (19.4%)	85 (43.4%)
Abdominal discomfort	55 (18.4%)	9 (8.7%)	46 (23.5%)
Allergy	18 (6.0%)	1 (1.0%)	17 (8.7%)
Obesity, swelling.	54 (18.1%)	12 (11.7%)	42 (21.4%)
Others: Crohn's dis., SLE, ITP, Fatigue, Insomnia, Epilepsy, Dizziness, Unspecified)	35 (11.7%)	1 (1.0%)	34 (17.3%)
Year of data collection			
2016	69 (23.1%)	29 (28.2%)	40 (20.4%)
2017	57 (19.1%)	14 (13.6%)	43 (21.9%)
2018	64 (21.4%)	25 (24.3%)	39 (19.9%)
2019	61 (20.4%)	13 (12.6%)	48 (24.5%)
2020	48 (16.1%)	22 (21.4%)	26 (13.3%)

The total number of cases in this study is 299, with an average of 20-30% per year, excluding the year 2020 due to the COVID-19 outbreak. The baseline characteristics of each group, including all cases, are presented in the left column of Table 1.

The majority of patients who underwent this test exhibited symptoms of chronic acne and chronic skin eruptions, such as seborrheic dermatitis, atopic dermatitis, and urticarial rash, with 103 and 105 cases respectively (34.4%, 35.1%). The baseline characteristics of the acne cases and non-acne cases are shown in the middle and right columns of Table 1.

Nevertheless, in acne cases, patients not only have chronic acne but also exhibit other symptoms such as chronic

skin eruptions in 20 cases (19.4%), obesity or swelling in 12 cases (11.7%), and abdominal discomfort in 9 cases (8.7%).

In non-acne cases, the most prevalent symptom among this group is chronic skin eruption, present in 85 cases (43.4%). Abdominal discomfort is the second most common symptom, with 46 cases (23.5%), followed by obesity or swelling with 42 cases (22.4%).

TABLE II: BASELINE CHARACTERISTICS OF THE PATIENTS WHO UNDERWENT IGG-MEDIATED FOOD INTOLERANT TESTING DURING 2016-2020, COMPARING ALL CASES, ACNE CASES AND NON-ACNE CASES)

Ranking	Type of food	All Cases (n=299)		Acne cases (n=103)		Non-Acne cases (n=196)		Frequencies	Median titer
		Frequencies (%)	Median titer (U/ml)	Frequencies (%)	Median titer (U/ml)	Frequencies (%)	Median titer (U/ml)	*Chi2 p value*	*KWallis test p value*
1	*Cola Nut*	96.0	53.0	95.2	55.0	96.4	53.0	0.866	0.826
2	*Barley*	92.3	49.0	91.3	48.0	92.9	49.0	0.886	0.551
3	*Egg White*	91.6	76.0	91.3	78.0	91.8	75.5	0.986	0.958
4	*Yeast (Brewer's)*	85.6	49.0	86.4	51.0	85.2	49.0	0.961	1.000
5	*Milk (Cow)*	85.3	82.0	87.4	84.0	84.2	81.0	0.760	0.782
6	*Corn (Maize)*	82.9	45.0	84.5	45.0	82.1	47.0	0.879	0.741
7	*Pea*	77.3	50.0	78.6	49.0	76.5	50.0	0.918	0.973
8	*Pistachio*	74.3	38.0	70.9	35.0	76.0	40.0	0.626	0.555
9	*Wheat*	73.9	33.0	72.8	31.0	74.5	34.0	0.952	0.857
10	*Milk (Sheep)*	70.9	47.0	72.8	47.0	69.9	48.0	0.870	0.741
11	*Casein*	69.9	64.0	72.8	73.0	68.4	62.5	0.728	0.632
12	*Plum*	69.9	30.0	66.0	29.0	71.9	31.0	0.570	0.433
13	*Bean (Red Kidney)*	69.9	33.0	66.0	30.0	71.9	36.0	0.570	0.238
14	*Bean (White Haricot)*	65.9	34.0	68.9	38.0	64.3	31.5	0.723	0.830
15	*Milk (Goat)*	60.2	36.0	62.1	39.0	59.2	34.0	0.884	0.412
16	*Aloe Vera*	59.5	27.0	58.3	26.0	60.2	28.0	0.948	0.670
17	*Cashew Nut*	55.9	26.0	54.4	26.0	56.6	27.0	0.932	0.713
18	*Almond*	50.8	24.0	51.5	24.0	50.5	24.0	0.988	0.918
19	*Malt*	45.5	22.0	40.8	21.0	48.0	22.0	0.495	0.701
20	*Potato*	44.8	21.0	40.8	20.0	46.9	22.0	0.596	0.482
21	*Yeast (Baker's)*	43.1	19.0	41.8	18.0	43.9	21.0	0.939	0.564
22	*Agar Agar*	41.1	19.0	37.9	18.0	42.9	20.0	0.706	0.981
23	*Ginkgo*	40.8	17.0	42.7	18.0	39.8	17.0	0.887	0.947
24	*Hazelnut*	39.5	19.0	38.8	19.0	39.8	19.0	0.987	0.939
25	*Alga Wakame*	37.5	15.0	40.8	16.0	35.7	15.0	0.691	0.792
26	*Gliadin**	34.8	16.0	36.9	18.0	33.7	14.5	0.857	0.954
27	*Brazil Nut*	33.8	16.0	32.0	15.0	34.7	16.5	0.899	0.955
28	*Sunflower Seed*	33.1	16.0	28.2	13.0	35.7	17.0	0.419	0.211
29	*Rice*	32.4	15.0	35.0	15.0	31.1	14.0	0.798	0.958
30	*Soya Bean*	30.4	14.0	35.0	15.0	28.1	13.0	0.469	0.560

All 299 reports of food-specific IgG Antibody measurements were analyzed to determine the frequencies of each type of food that exhibited high significant titers. If a food's titer falls below 23 U/ml, it is considered non-significant; if it exceeds 30 U/ml, it is deemed strongly significant; and if it falls between 24-29 U/ml, it is considered mildly to moderately significant.

The pattern of serum concentration titers for each food-specific IgG antibody is characterized by an abnormal distribution. Therefore, the median titer is calculated and presented for each type of food.

The top 30 types of food, along with their median titers in all cases, acne cases, and non-acne cases, are shown in Table 2. They are ranked based on the frequencies from highest to lowest among the common types of food in all cases.

The top 30 common types of foods in all cases, acne cases, and non-acne cases appear to be the same in terms of type and ranking, as shown in Figure 1. There is no statistical significance when comparing the frequencies and median titers of each type of food between the groups. However, it should be noted that non-acne cases consist of patients with varying symptoms.

From Table 2, it can be observed that the top 18 common types of foods in each group share the same type and pattern, and they are found in more than 50% of the population. Additionally, their median titers are all above 24 U/ml, which is the cut-off point for clinically significant titers.

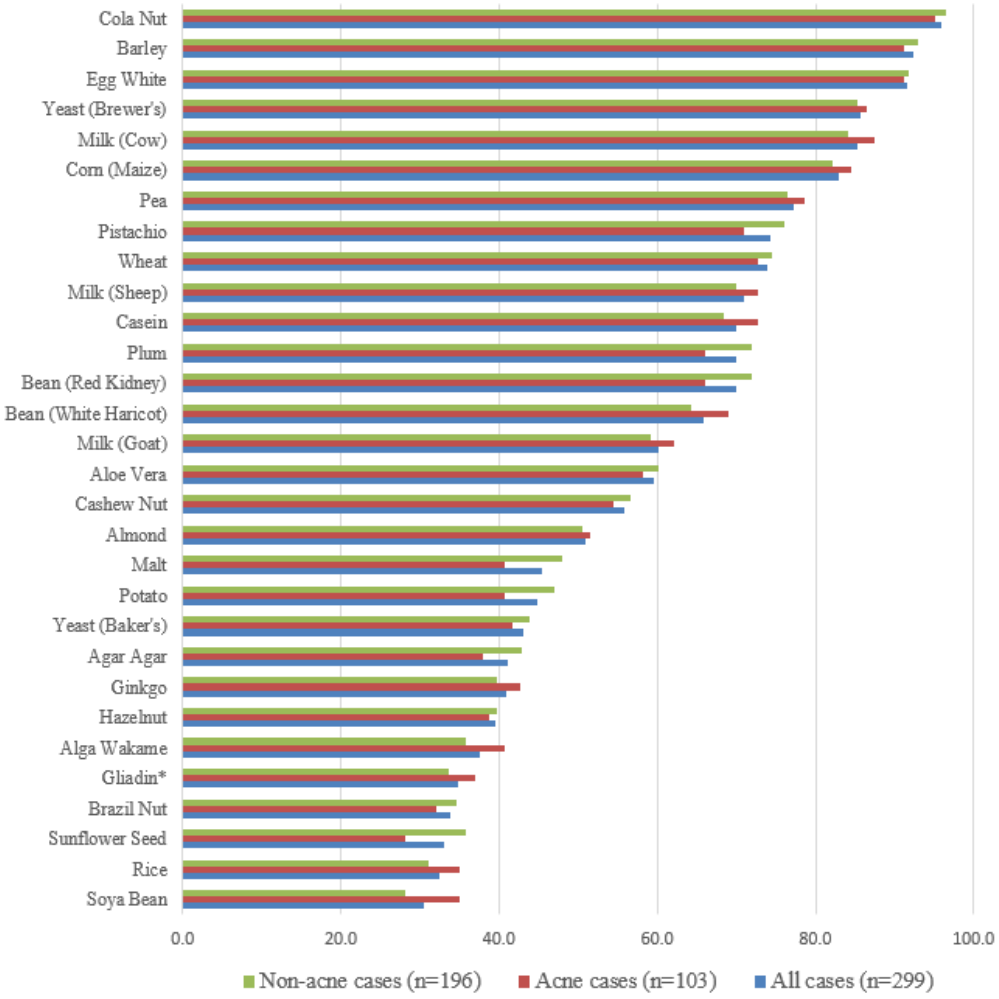

Fig. 1. The top 30 common types of food specific IgG antibodies in all cases and each group.

When comparing the median titers of the top 30 common types of food in each group, their ranking appears to correlate with the ranking based on the highest to lowest frequencies (percentage of the population) except for cow milk, egg white, and casein. (as shown in Figure 2).

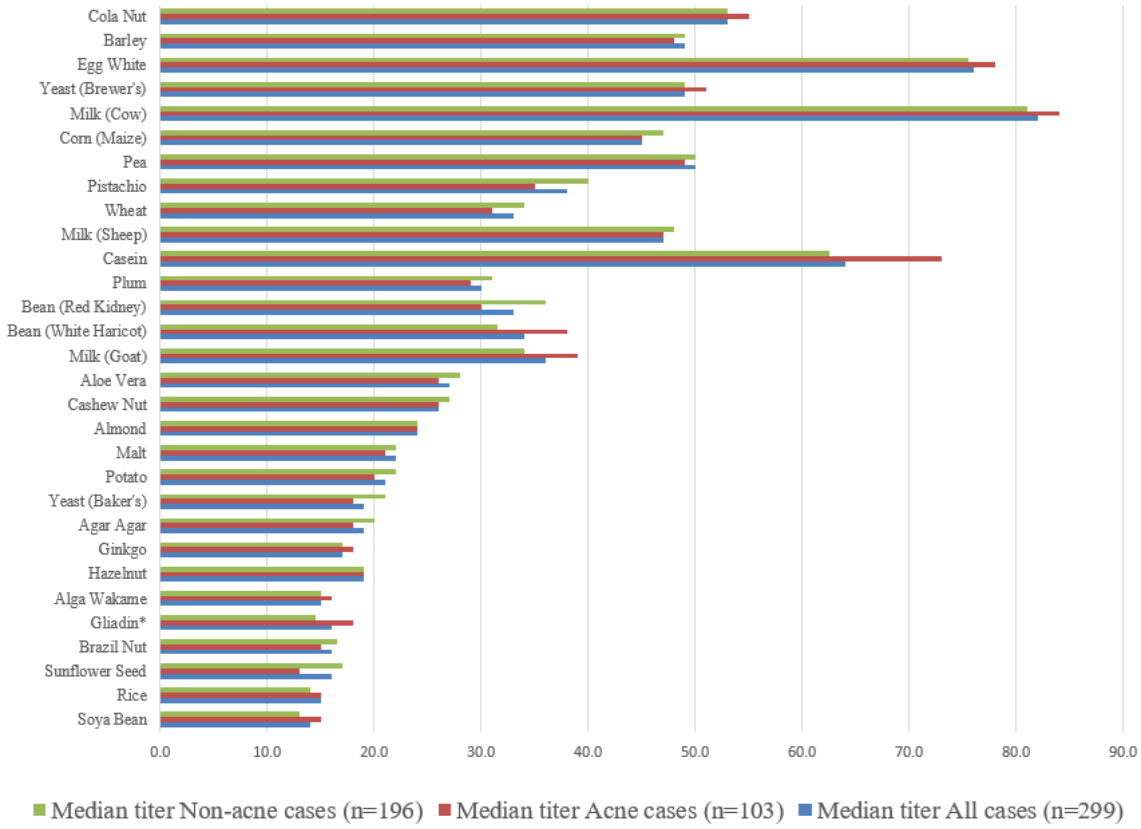

Fig. 2. The median titres of the top 30 common types of food-specific IgG antibodies in each group.

V. DISCUSSION

To evaluate and interpret the implications of the results, it is importance to consider that the clinically significant titer of food-specific IgG antibodies is above 23 U/ml. Therefore, the cut-off point for clinical application is the top 18 ranking, where all median titers of each food exceed this threshold. Additionally, there are no differences observed in the type of food, frequencies, and median titer patterns among all groups.

From Table 2, it can be observed that the top 18 common types of foods in each group share the same type and pattern, and they are found in more than 50% of the population. Additionally, their median titers are all above 24 U/ml, which is the cut-off point for clinically significant titers.

Importance of the finding: The top ten finding in this report appear to have the same type and pattern as as those observed in

Saudi Arabian patients with allergic symptoms, as reported by Zahid Shakoor et al, 2016 [13]. This suggests that there might be no significant ethnic difference regarding the type and pattern of common IgG-mediated food reactions.

This report suggests that it could be applied to patients who exhibit symptoms suggestive of IgG-mediated food intolerance but cannot afford the testing.

Limitations of the study include the fact that the data is derived from a single anti-aging clinic in Thailand, therefore the findings cannot be generalized to the entire anti-aging practice in the country. Additionally, follow-up studies could not be conducted to assess the effects of dietary elimination due to incomplete follow-up data. Moreover, the study does not address the efficacy or standard of treatment using this test for specific conditions such as chronic adult acne, chronic skin eruptions, obesity, and autoimmune diseases.

Directions for future research in this area should focus on investigating the efficacy and outcomes of an elimination diet guided by IgG-mediated food intolerance testing in various chronic conditions associated with gut dysfunction.

VI. CONCLUSION

The most common indications for patients tested with food-specific IgG antibodies in this study are chronic adult acne and chronic skin eruptions. It appears that there is a consistent pattern in the type of food, frequencies, ranking, and median titers among all cases, the acne cases, and non-acne cases.

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