

Fish and Egg Specific Immunoglobulin E in Multiple Sclerosis Patients

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ABSTRACT

Background: The effect of nutrition in the course of multiple sclerosis (MS) is a topic of great interest. The present study was aimed to evaluate the immunoglobulin E (IgE) against egg and fish in MS patients compared to healthy controls.

Methods: Between March 2012 and July 2012, 48 MS patients were selected and compared with 48 healthy subjects to assess the frequency of IgE against egg and fish in MS patients compared to healthy control. Fish and Egg specific IgE was determined by Immuno CAP. Sex and the frequency of specific IgE were compared between study groups by Chi-square test.

Results: Total of 96 subjects was assessed (22% male and 78% female). The mean age of the study subjects was 30.8 ± 6.6 years. Mean age of case and control groups was $30.7 (\pm 6.9)$ versus 30.9 ± 6.3 , respectively ($P = 0.83$). There were no detection of egg and fish specific IgE in serum of MS patients and healthy subjects.

Conclusions: IgE allergy against fish and egg may be very unlikely to affect MS course.

Keywords: Allergy, egg, fish, immunoglobulin E, multiple sclerosis

INTRODUCTION

Multiple sclerosis (MS) is one of the most common neurologic diseases in young adult. It has been considered to be an inflammatory autoimmune disease of central nervous system, which is often associated with varying degree of disability and impaired quality of life.^[1]

Despite the etiology of MS is not determined yet, it is believed that both genetic and environmental factors play role in its pathogenesis.^[2] It is believed that MS is an autoimmune disease and mediate by CD4⁺ type 1 T helper cells, but a variety of other immune cells including, B cells, CD8 T cells may involve in pathogenesis of disease too.^[3]

It is postulated that an antigen begin the immunologic process in MS disease but these target are still uncertain.^[4]

Viral infections, emotional stress, heat exposure, and allergic reactions to foods were suggested as factors that can trigger exacerbation in MS patients.^[5]

Food allergens were supposed as one of offending substances which may trigger the allergic process and cause immunoglobulin E (IgE)-mediated reactions,^[6] therefore, since many years ago allergenic reaction as a causative factor in MS was suggested.

One study showed improvement of MS patients, after avoiding foods to which they have allergic and recurrence of symptoms after reuse of such foods.^[7]

In spite of more than 170 foods identified to induce allergic reactions, a few are the most common offending substances and fish and eggs are between these agents. It is supposed that life-long food allergies may lead to autoimmune diseases.^[8]

Egg is noticed as one of the most allergenic foods and fish is another one that its allergic reactions via ingestion begin in the 1st 24 months of life.^[9,10]

The effect of nutrition and dietary supplements on the course of MS is a topic of great interest for both patients and clinicians. Usually MS patients ask regard the role of change the diet habits and effect of different foods in the course of their disease. Indeed, avoid the food that induce immunity in body may have a role in prevention of autoimmune disease, so, avoiding use of food allergens such as fish and egg may be effect on MS course.

Furthermore, some studies indicated usefulness of omega-3 fatty acids in the management of autoimmune disease due to anti-inflammatory properties and immunomodulatory activities.^[11] Among omega-3 polyunsaturated fatty acids (PUFA) those from fish oil is more potent.^[11]

Omega-3 fatty acid have supposed to have potential therapeutic role in Relapsing-remitting multiple sclerosis (RRMS) patients,^[12] and the efficacy of omega-3 fatty acid supplements from fish oil in reduction MS exacerbation was suggested by a small clinical with no control patient group.^[13] One study was reported improvement of motor performance in healthy rat pups after consumption of fish oil.^[14]

However, there are some controversies in effect of fish meal; it can trigger specific IgE antibodies production by plasma cells, additionally, omega-3 PUFA from fish oil may have immunomodulatory property.

Such controversies along with the hope to find all of the way that improve course of disease

moved us to design this study. We evaluated the specific IgE antibody against egg and fish as a part of major food allergens in patients with MS compared to healthy control group.

METHODS

Study description

The present study is conducted on patients with MS referring to Kashani MS clinic affiliated to Isfahan University of Medical sciences, during November 2011 to November 2012.

Patients with clinically definite MS according to the McDonald criteria^[15] and age between 20 years and 40 years were eligible, if they had not received corticosteroids during last month and immunosuppressive drug over last 3 months.

This study was approved by the Ethics Committee of Isfahan University of Medical Sciences (approval code: 189035) and all subjects were explained about the aims and the purposes of the study. Written informed consent was obtained from all of them.

A total of 48 MS patients were randomly selected from registered patients of Kashani MS clinic by using a table of random values. Then 48 healthy individuals without positive history of MS disease who were matched with the MS patients regarding to age and gender were selected as control group.

After collecting demographic data by a pretested questionnaire, blood samples were taken from both groups.

Allergen-specific IgE against fish was measured by Immuno CAP technique (Phadia, Uppsala, Sweden).

Statistical analysis

Statistical analysis has been performed with SPSS -20. Data were presented as means \pm SD or number(%) based on the variables. Age was compared between two groups by independent-samples *t*-test. Chi-square test was used to assess results of positivity frequency of specific IgE antibody against wheat, soy and nuts between groups.

Statistical significance was accepted at $P < 0.05$.

RESULTS

The mean age of the subjects was 30.8 ± 6.6 years

in MS group and 30.9 ± 6.3 years in control group. In both groups 11 subjects (22%) were males and 37 (78%) subjects were females.

There were no significant differences between case and control groups regarding age and gender. IgE antibody against fish was negative in all of MS patients and controls ($P = 1$) and IgE antibody against egg was negative in all of MS patients and controls ($P = 1$) [Table 1].

DISCUSSION

In present study no subjects in both MS group and control has IgE against egg and fish.

Our finding is accordance with result of one study that showed low prevalence of IgE-mediated allergic disease in MS patients.^[16] and is comparative with the results of Oro AS that showed low number of positive allergen-specific IgE test in MS patients.^[17]

Indeed, Bergamaschi *et al.* was showed less probability to allergic respiratory diseases (ARDs) and allergic rhinitis in MS patients.^[18] Moreover, it is showed patients with atopic diseases should be less prone to autoimmune diseases such as MS.^[18] One research showed less severity of MS disease when associated with ARDs and less prevalence of MS in subjects affected by atopic diseases.^[19]

These studies should support the hypothesis that suggested protective effects of genetic

Table 1: Comparison of subjects characteristics and results of egg and fish specific immunoglobulin E between study groups

Study groups	MS patients (n=48)	Controls (n=48)	P value
Age (year)	30.7±6.9	30.9±6.3	0.83 [†]
Sex			
Male	11 (22.9)	11 (22.9)	1*
Female	37 (77.1)	37 (77.1)	
Egg specific IgE			
Positive	0	0	1*
Negative	48 (100)	48 (100)	
Fish specific IgE			
Positive	0	0	1*
Negative	48 (100)	48 (100)	

Data presented as Mean±SD and number (percent), P values calculated by [†]Independent sample t-test and *Chi-square test, IgE=Immunoglobulin E, MS=Multiple sclerosis

factors that make susceptibility to T helper type 1 (Th1)-mediated immunity in MS patients against the development of T helper type 2 (Th2)-mediated disease such as allergic disease.^[17]

In the other hand, association between MS and diseases that mediated by both Th1 and Th2 has been reported by other investigation.^[20] Generally, excess production of Th1 cytokines (IL-2 and interferon-gamma) in myelin-reactive T cells and cell mediated immunity plays major role in pathogenesis of disease such as MS, experimental autoimmune encephalitis and insulin-dependent diabetes mellitus, whereas, the base of pathogenesis of systemic autoimmune diseases with a strong humoral component such as allergy is T cells that produce Th2 cytokines (IL-4, IL-5, and IL-10).^[17,21]

Infections specially, Epstein-Barr virus (EBV) is one of the factors that is postulated have a role on MS development, indeed, it is now suspected that it should have a promoting role in IgE-mediated egg food allergy.^[22] According to these suggestions, EBV may trigger both MS and food allergy and it may show association of diseases mediated by both Th1 and Th2.

It is postulated that long-life allergy should trigger immune reaction.^[8] Focusing on the association of different foods with immune system and demyelination process, different allergens such as fish and egg may have a possible effect on MS. Indeed, IgE-mediated mast cell in pathogenesis of MS as an autoimmune disease has suggested by Calenof.^[23] Therefore, assessing the role of IgE against foods might be also important in the determinants of MS and elucidating the protective or detrimental effect of mast cells. The role of different food and some allergens in beginning and progression of MS was reviewed by researcher.^[24]

Furthermore, protective effect was also reported with fish among women that suffer from MS.^[16]

Although, all of disease that caused by food allergens are not mediated by IgE, assessment of IgE may help in detection of some allergenicity.^[19]

However, fish is one of the sources of omega 3 fatty acid and there are some controversies about consumption of omega 3 in MS patients. Benefit of omega-3 fatty acids in MS was reported by Shinto *et al.*,^[25] in the other hand, no beneficial effects were reported by using omega 3 fatty acid in MS patients in other studies.^[26,27]

CONCLUSIONS

With respect to the results of our study, we conclude egg and food IgE were not high in MS patients and IgE allergy against fish and egg may be very unlikely to affect MS development and intake egg and fish are not inhibited. However, more studies with larger sample size are needed to confirm this finding.

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