Hen's Egg White Allergy in Egyptian Infants and Children

Thesis submitted for partial fulfillment of master degree in Pediatrics

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الحساسية لبياض البيض في الرضع و الأطفال المصريين

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SUMMARY

Egg allergy can lead to any clinical form of allergy up to anaphylaxis. We sought to screen for egg allergy in a group of Egyptian infants and children with different allergic manifestations in order to evaluate the impact of egg sensitization/allergy on their allergic disease. We consecutively enrolled 80 subjects from the Pediatric Allergy and Immunology Unit, Children's Hospital, Ain Shams University during the period from October 1, 2007 to December 31, 2008. An informed consent was obtained from the parents or care-givers prior to enrollment.

Detailed history was taken for the duration and severity of symptoms, possible precipitating factors, response to treatment and family history of allergy. A clinical examination was conducted to verify the diagnosis and exclude other chronic illness. The study measurements included skin prick testing with a commercial egg extract and serum egg white specific IgE. Children with suspected egg allergy (positive history of exacerbation or positive results in one of the tests) were subjected to an open oral challenge test in the Children's

Hospital under close observation taking all the necessary precautions.

The study revealed that egg white allergy is 28.75% (n=23) by positive history, positive skin prick test and/or elevated serum egg IgE among the studied sample. 12 patients had suspected egg allergy of whom 6 underwent open oral egg challenge. One out of the 6 patients had positive oral challenge results giving an overall estimation of egg allergy about 30% (n=24). None of our patients had history of peanuts or chicken meat intolerance.

Both skin prick test and serum specific IgE to egg white results to egg white did not vary significantly with sex, family history of allergy and different allergic diseases. Younger age of the studied children had higher frequency of positive SPT to egg white when compared to older ones while the results of serum specific IgE to egg white did not vary with age. Also patients with positive SPT and specific IgE results to egg white had higher frequency of allergic exacerbation on exposure to egg white versus those negative results.

In conclusion, egg allergy in Egypt is not uncommon. The combination of history of allergy following egg ingestion, positive SPT/ specific IgE is a good tool for diagnosis.

However, oral food challenge remains the gold standard in suspected cases. So, diagnosis of egg allergy needs meticulous evaluation. Further wide-scale studies are needed to be able to outline the real extent of the problem in our country. We also need to raise the awareness of the health care workers and the public to the fact that egg sensitization (positive SPT/specific IgE and negative history) should not indicate egg avoidance but rather follow up and patient education about symptoms of food allergy.

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LIST OF ABBREVIATIONS

AD	*Atopic dermatitis*
APT	*Atopy patch test*
AR	*Allergic rhinitis*
BA	*Bronchial asthma*
DBPCFC	*Double blind placebo-controlled food challenge*
EAST	*Enzyme allegro sorbent test*
EE	*Eosinophilic esophagitis*
ELISA	*Enzyme-linked immunosorbent assay*
FA	*Food allergy*
Fcε receptors	*Fc-epsilon receptors*
Gal d	*Gallus domesticus*
ICs	*Inhaled corticosteroids*
IgE	*Immunoglobulin E*
IL-5	*Interleukin-5*
kDa	*kilodalton* ($=1.660538921(73)\times10^{-27}$kg)
kU$_A$/L	*kilo antibody units per litre (kilo international units allergen specific antibody)*
LABA	*Long acting Beta 2 agonist*
LOAEL	*Lowest observed adverse effect level*
MMR	*Measles, mumps and rubella*
NPV	*Negative predictive value*
OFC	*Open food challenge*
OIT	*Oral immunotherapy*
POC	*Point-of-care*

PPV	*Positive predictive value*
RAST	*Radioallergosorbent test*
SD	*Standard deviation*
SPT	*Skin prick test*
SOTI	*Specific oral tolerance induction*

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INTRODUCTION

The incidence of food allergy in children is approximately 6%. It is more common and prevalent in children under 3 years of age than in older children ***(Sampson & Leung, 2004).***

Allergic sensitization to foods in infancy is a risk factor for respiratory tract allergic disease, including asthma, later in life. Asthma is a significant risk factor for life-threatening food-allergic reactions. Acute food-induced respiratory reactions are typically accompanied by cutaneous and gastrointestinal symptoms as a component of systemic anaphylaxis. There are also circumstances when isolated rhinitis or asthma is induced by food, but these are uncommon ***(John, 2003).***

Egg is one of the most important allergen in childhood feeding. The pathogenic mechanism in egg allergy is immediate, type 1, IgE-mediated hypersensitivity, although other mechanisms are possible ***(Alessandri & Calvani, 2006).***

There are four groups of hen egg white allergens: group1, the egg white proteins lysozyme and ovalbumin; group2,

ovomucoid; group3, ovomucin; and group 4, ovotransferrin together with the egg yolk proteins apovitellinins I and VI and phosvitin. A person may be genetically predisposed to produce IgE antibodies to one group of egg proteins or another but not to all of the groups. The sensitization to egg allergens is dependent upon variation in patients but not upon the nature of the allergens ***(Walsh et al., 2005).***

AIM OF THE WORK

The aim of this work is to study the frequency of hen's egg white sensitization among a group of Egyptian atopic infants and children in a trial to outline the significance of this antigen in the exacerbation of chest allergy in our country.