



## TWO PATIENTS OF EGG ALLERGY CAUSING BRONCHIAL ASTHMA WITH BRIEF REVIEW OF LITERATURE

### Pharmacology

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### ABSTRACT

Two patients of bronchial asthma caused by oral egg allergy have been reported and confirmed by oral egg challenge. To our knowledge no such cases have been reported in the literature and a follow up of 35 and 30 year has been done and both patients are doing well.

### KEYWORDS

Egg allergy, bronchial asthma

#### HIGHLIGHTS

What is already known about this topic ?

Egg allergy is an immune hypersensitivity to protein found in the chicken, goose, duck and turkey eggs; causing skin rash, hives, itching, nausea and vomiting and even anaphylaxis.

What does this article add to our knowledge?

This article depicts that nasobronchial allergy can be caused by egg allergy alone and it could be aggravated by exercise just like the wheat allergy. So no desensitization is required, nor any oral drugs. Patient can avoid eggs and food containing eggs.

How does this study impact management guidelines?

Usually in bronchial asthma the patient has a lot of financial burden of drugs. A correct diagnosis will result in reduction of financial burden and the patient may not have to undergo desensitization for 3- 5 years.

#### INTRODUCTION

300 million people world wide suffer from asthma with 2,50, 000 annual deaths.[1] Asthma is rarely a manifestation of food allergy alone, but the symptoms can be seen with foods too. Data compiled from six studies using oral food challenge (OFC), the prevalence of food allergy was 1% and 10.8%. The most common food allergens in children are milk, egg, peanut, wheat, soy and tree nuts, fish and shell fish; but they vary country to country as mentioned about peanuts in India, Europe & USA as mentioned in diagnosis of food allergy underneath and 20% children may outgrow peanut allergy of 18 years by age.

#### Diagnosis of food allergy

This may depend on history, hidden ingredients like spices and colouring matter, history of previous ingestions and other factors like exercise, intake of drugs like aspirin and alcohol.[2] The history can lead to whether reaction is IgE mediated or Non Ig E mediated (usually T cell induced).

Cell mediated reaction are usually to cow's milk & soya and usually involve the gastro intestinal tract and affects infants[3] and they occur hours to days later.

Ig E mediated food reactions may affect the skin, gastrointestinal tract, respiratory tract and even cardiovascular system such as oral pruritus, urticaria, angiodema, vomiting, coughing and wheezing and hypotension and may lead to anaphylaxis.[4]

Asthma may actually be actually be a risk factor for fatal or near fatal anaphylaxis to foods. Reactions to peanuts and tree nuts accounted for most deaths in USA[5], but in India. FDR to cashew nut has been reported. [6]

Egg allergy is an immune hypersensitivity to protein found in chicken eggs and possibly goose, duck or turkey eggs [7] and symptoms can be either gradual or rapid onset, the former taking hours or days to appear; the latter could cause anaphylaxis which is a life threatening condition

requiring epinephrine. Also there could be atopic dermatitis or inflammation of the oesophagus.[8]

In India 90% of allergic symptoms are caused by cow's milk, eggs, wheat, fish, soyabean and rarely peanuts and tree nuts; while in USA all the above foods are common but allergy to peanuts mainly and tree nuts is quite common[9-15]. Why so is not known. We don't know why this is so especially to peanuts whether protein of peanuts or genetics of US or European people does not suit hence initially British Airways and later all the airlines stopped serving peanuts on national or international flights because of more than over 200 deaths on flights till 2000 A.D[13]. It is not clear whether introduction of eggs to babies early in infancy say at 4-6 months of age decreases the allergy to eggs, for this allergy perishes of by adolescence, or remain lifelong in say one third of the patients[14-15].

#### Symptoms And Signs Of Egg Allergy

Now on we will keep ourselves to egg allergy. Food allergies have a fast onset (from seconds to one hour) and egg intake may cause skin rash, hives, itching of the lip, tongue, throat, tongue, eyelids, difficulty in breathing, nausea, vomiting or fainting[16]. Children with dermatitis may also develop asthma and allergic rhinitis[17]. The basic cause is eating of eggs or foods that contain eggs like cakes and others. However vaccine especially influenza vaccine are created by injecting live virus into fertilized chicken eggs but a residual amount of egg white protein still remains. However for persons allergic to eggs, flu vaccine are also given on mammalian cell cultures. However gelatin or neomycin content of the vaccine should not be overlooked in severely allergic patients to flu vaccine. The measles and mumps components of MMR(measles,mumps and rubella) vaccine are cultured on chick embryo cell culture and contain trace amount of egg protein, pediatrician beware!but it could be given in an indoor set up and kept for at least one hour at the hospital. Exercise after vaccine or intake of wheat products too can cause anaphylaxis[18-19], many theories including exercise is stimulating the release of mediators such as histamine from IgE activated mast cells.

#### Case Report

##### Case 1

An apparently healthy male boy 15 years old came to me with occasional bouts of bronchial allergy in 1985, throughout the year but less in summer, much more in winter; the physicians mind is more likely towards pollens ( for the season) and house dust mite for the summer season. The patient was advised skin prick tests and intradermal tests (In those days only I/D tests were done)were done with practically all allergens and egg white and other foods. Egg white was more than 4+ positives. He was advised to eat one half egg at my clinic and just in 15- 30 minutes his chest was full of rhonchi and he complained of breathlessness for which injection epinephrine was given 0.5 ml subcutaneously (Intramuscular was nowhere in scene in those days in India) followed by the rest 0.5 ml subcutaneously slowly in 5 minutes say after 15 minutes and the patient was perfectly normal in one and half hour. The patient was advised not to eat eggs or egg containing cakes and other egg containing food etc. and avoid any vaccines. Which he followed judiciously The patient is perfectly normal after 35 years that is in the year 2020. The patients serum IgE was 2100 and drop to 500 in 2018 end. It may not be out of place to

mention here that his father and two uncles expired between the ages of 50-55 years, lest any relation about myocardial infarction comes say after two to three decades.

## Case 2

A healthy adolescent male 14 years old also had a similar history of occasional bouts of bronchial asthma in the year 1990 with similar situation about the prick tests, which had started by now and serum IgE was 3300 and oral challenge too was positive. He too was advised the same things as to the above patients. No immunotherapy was done as shelf life of eatable foods vaccine is only 3 months. This patient too is perfectly normal except twice when he inadvertently took some egg contain food. There is no other relevant history regarding this patient, including no family history of allergy.

## DISCUSSION

In these two cases IgE mediated reaction to egg protein which is most common manifesting changes within a few minutes after eating and may progress to anaphylaxis for which epinephrine must be in hand especially if you are doing an oral challenge test. However non IgE mediated reaction too could occur taking hours to days after eating and causing a headache to the physician to diagnose. A 3rd reaction IgE and non IgE mediated too may occur what is called a hybrid of the two above mentioned reactions.

Acute reaction in early stages show lymphocytes previously sensitized to a specific protein react by producing a specific antibody called secretory IgE, which in blood binds to IgE specific receptors on the surface of other types of immune cells called mast cells and basophils. Activated mast cells and basophils undergo degranulation and they release histamine and other chemical mediators called (cytokines, interleukins, leukotrienes and prostaglandins) into the surrounding tissues causing vasodilatation, mucous secretion, nerve stimulation and smooth muscle contraction which leads to running nose, itchiness, shortness of breath, ultimately anaphylaxis and also involving the lungs to cause bronchial asthma and eczema in the skin[20].

Following the subsidence of acute reaction, late phase reaction could occur because of migration of other white blood cells like neutrophils, lymphocytes, eosinophils and macrophages to the initial reaction site which usually occurs 2-24 hours later[21].

Non allergic tolerance may not be discussed here because that causes different symptoms like abdominal pain, diarrhea[22] and if sufficiently strong it could cause anaphylactoid reaction which is clinically indistinguishable from true anaphylaxis.

## Immunotherapy

Immunotherapy was not done because of shelf life of only three months for foods. There is a research on sublingual immunotherapy (SLIT), but the results are equivocal so for the time being avoidance of egg in any form is better. Similarly a tablet Pelforzia has been developed for peanut allergy, but it is too costly \$890/month which is very much out of reach for a good earning person. Protein products have been tested and many contain milk protein were not always indicated on the label[23]. The majority of children outgrow egg allergy 2-6 years.[24, 25, 26] To the best of our knowledge screening the Pubmed for bronchial allergy due to egg eating and proven by oral challenge have not been reported in literature and the ration of this may be just two cases out of ten thousand cases tested, there could have been rare case of egg allergy causing bronchial asthma to have been missed by us too.

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