RESEARCH ARTICLE

PREVALENCE OF IGE MEDIATED AIRBORNE ALLERGIES IN CHILDREN

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ABSTRACT:
Respiratory allergies constitute one of the major allergic disorders affecting children at global level. In the Renuka Diagnostics Laboratory, serum samples of 280 children (aged between 05-11) were tested for Inhalation allergy (IgE) on commonly occurring airborne allergies. The study has confirmed house dust mites and dermatrophs as the major cause of respiratory allergies among children. Strict avoidance of allergens is the only well-established management strategy for the disorder.

Key Words: Asthma, Rhinitis, Inhalation, Anaphylaxis, Immunological reaction, allergic reactions.

INTRODUCTION:
Classically, allergy is described as an exaggerated, specific immunologic reaction to foreign (exogenous) particles attaining pathological dimensions. Immunoglobulin E (IgE) is the type of antibody concerned with body’s defense against parasites. But in allergic individuals this antibody erroneously takes the protein of the allergen as a threat and is released to attack them. Within the past three decades, there has been a rising trend for prevalence of asthma and allergic diseases worldwide, particularly from developed and industrializing countries. Allergic rhinitis is characterized by nasal symptoms consisting of rhinorrhea, nasal block-age and sneezing triggered by and IgE mediated reaction to allergens. Respiratory allergic disorders like rhinitis and asthma are common conditions that not only affect target organs, but complicate the daily life of affected children and adolescents. Seasonal allergic conjunctivitis (SAC) and perennial allergic conjunctivitis (PAC) are the most common forms of ocular allergies. Allergic conjunctivitis is caused by an allergen-induced inflammatory response in which allergens interact with IgE bound to sensitized mast cells resulting in the clinical ocular allergic expression. The pathogenesis of allergic conjunctivitis is predominantly an IgE-mediated hypersensitivity reaction. The house dust mite (HDM) is a major perennial allergen source and a significant cause of allergic rhinitis and allergic asthma. However, awareness of the condition remains generally low. This review assesses the links between exposure to HDM, development of the allergic response, and pathologic consequences in patients with respiratory allergic diseases. Air pollutants play a part in the incidence of allergies, but their part towards pollens is not perfectly elucidated. One important point to consider is the enhanced granule liberation by exposed pollens. Due to the small size of the granules, the allergen bioavailability may increase, leading to higher incidence of respiratory allergies.

MATERIALS AND METHODS:
Blood samples of 280 children (of age group 5 to 11, with symptoms of prolonged sneezing, runny nose, water-itchy eyes, chronic cough) samples were collected and tested at Renuka Diagnostic Laboratory, Bangalore during 2011-2012 have been considered for the current study. Identification of inhalation specific IgE antibodies for air borne allergens which trigger the allergic reactions such as rhinitis, asthma, anaphylaxis, atopic dermatitis, allergic conjunctivitis was carried out. Euro Immuno-Euro Inhalation India (IgE) Professional kit (Euroimmun Medizinische Labordiagnostika AG) was used for diagnosing the allergic conditions. The Euro Immune test kit provides allergen coated test strips. The test strips are coated with parallel lines of 20 different allergen extracts, Human serum/plasma can be used as the test sample. Serum/plasma can be diluted 1:11 with the pre-diluted universal buffer. The diluted sample was incubated overnight on a rocking shaker at room temperature. The following day, the buffer was discarded and the strip was treated with the conjugate and kept on rocking shaker for an hour and excess conjugate was discarded. The strips were washed and treated with substrate and kept on rocker for 10 minutes. The strip has a ccd (Indicator band), which acts as an indicator of perfect protocol followed. Rest of the bands appeared indicate the presence of air borne allergens in the patient’s blood sample. It is a semi-quantitative in-vitro assay for human IgE antibodies to...
inhalation allergens in serum or plasma hence does not indicate any specific medical condition. In positive samples, specific antibodies of class IgE remain bound to allergens.

RESULTS:
The Euro Immune-Euro Inhalation India (IgE) Professional kit tested for the detection of airborne specific IgE antibodies for 20 allergens. The results of 280 patients are presented in Fig. 1.

![Antibody reactivity of the patients with different allergens](image)

**Figure 1:** Comparative evaluation of IgE antibody response to common allergens among children *Mite mix=all the mites present in dust, Dermatroph= parasitic mites feeds on skin

**RESULTS AND DISCUSSION:**
The study has confirmed that house dust mite and dermatroph (*Dermatophagoides pteronyssinus & Dermatophagoides farinace*) as the major cause of IgE mediated airborne allergies among children. Cockroach, straw dust and dog allergens ranked next in sequence inducing allergic rhinitis among children. Meanwhile considerable number of children was found to be positive for sheep wool, jute, pigeon feathers and cat allergens.

For children at high risk of allergy, maternal exclusion diet during lactation and protein hydrolysate as a supplement or alternative for children who could not be breast-fed seems to provide further protection. The preventive effect of avoidance of house dust mite allergen alone during pregnancy or after birth is disappointing. However, prospective randomized studies evaluating a combined food and house dust mite allergen avoidance regimen show some protection against atopic dermatitis in infancy and asthma in later childhood.

According to a study in the Journal of Allergy and Clinical Immunology (2004;114:807–13): allergic disorders among children can be minimized through supplementing diet with fish oil, avoiding dust mite allergens at home, and reducing children’s exposure to cigarette smoke as well as common allergens such as dust mites and animal dander. In a review article, of 56 studies selected, the review group concluded that breastfeeding seems to protect from the development of atopic disease. The effect appears even stronger in children with atopic heredity. If breast milk is unavailable or insufficient, extensively hydrolysed formulas are preferable to unhydrolysed or partially hydrolysed formulas in terms of the risk of some atopic manifestations.

Allergy immunotherapy (AIT) is an effective treatment for allergic asthma and rhinitis, as well as venom-induced anaphylaxis. In addition to reducing symptoms, AIT can change the course of allergic disease and induce allergen-specific immune tolerance.

Inhaler therapy can efficiently treat asthma and other chronic airway diseases. Inhaler devices are of various types, such as metered dose inhalers (MDI) or dry powder inhalers (DPI). Regardless of the type of inhaler device employed, appropriate use of the inhaler can give accurate result.
Initially, the medication should be clearly explained and well demonstrated. Therapy schedule should be discussed, particularly when more than one medication is prescribed. An explanation of the dissimilarity between maintenance therapy and rescue medication is fundamental. Further studies into the effect of education and monitoring on the appropriateness of inhalation technique in children are recommended 10.

RECOMMENDATIONS:

In children with allergic rhinitis, immunotherapy may prevent the consequent development of asthma 11.

WHO Strength of Recommendations:

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<th>Table 1: summary of specific recommendations 11:</th>
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<td><strong>Identifying infants at risk of allergic disease</strong></td>
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<td><strong>Allergen avoidance in pregnancy</strong></td>
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<td><strong>Breastfeeding</strong></td>
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