

Sublingual Immunotherapy in Children with House Dust Mite - Induced Allergic Rhinitis

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Abstract

House dust mite is the most common indoor allergens to which children are exposed. Majority of children get sensitization to house dust mite allergen due to constant exposure at home and develop various forms of allergic disorders. Allergen immunotherapy is the choice of treatment where avoidance of exposure of causal allergens is not feasible. For reparatory allergic disorders in children, sublingual immunotherapy (SLIT) has been developed as an alternative to subcutaneous immunotherapy (SCIT). SLIT is more convenient, has a good safety profile and might be an alternative option for use in respiratory care, especially in children.

Our study was designed in accordance with recent recommendation of sublingual immunotherapy research. A total number of 100 children suffering from allergic rhinitis were selected in this study. All the subjects had strong skin positive reactions to different species of mites. SLIT was administered with house dust mite allergens as an alternative treatment. Our results of SLIT with dust mite allergens showed significant reduction in symptoms with considerable efficacy and good safety profile in children suffering from house dust mite induced allergic rhinitis.

Introduction

Allergen specific immunotherapy involves administration of increasing doses of allergen to a patient to achieve clinical and immunological tolerance over time. Allergen immunotherapy induces T cell tolerance by several methods, including decreased allergen induced proliferation, alternation of secreted cytokines and the production of T regulatory cells.¹ Immunotherapy for respiratory allergic disease is clearly effective compared with placebo and requires three or more years of treatment to obtain durable efficacy. More recently

allergen immunotherapy for aerollergens has been delivered by sublingual swallow immunotherapy (SLIT). Meta analysis of the many trials of this form of treatment confirms its safety and efficacy.²

For respiratory allergic disorders in children, sublingual immunotherapy has been developed as an alternative to subcutaneous immunotherapy. Sublingual immunotherapy is more convenient, has a good safety profile and might be an attractive option for use in primary care.³

Material and Methods

One hundred children between the age group of 7-12 years suffering from allergic rhinitis were included in this study. They were subjected for detailed physical

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examination, family history etc. To confirm the sensitivity of house dust mite, prick test was employed. Allergens with positive reactions equivalent to histamine (positive control) were incorporated in the formulation of sublingual immunotherapy mixture.

Glycerinated aqueous allergic extracts for sublingual allergen immunotherapy consisted of mite allergens as determined by the sensitivity test (skin prick test). Composition of treatment extract was determined by patient's individual sensitivity spectrum. Proportion of different mite allergens were specified on each immunotherapy set. The mite allergens suspended in extracting fluid (Coca's solution) containing 50% glycerin I.P. was standardized according to w/v ratio of the native material to the extracting fluid. Each course was provided in multi dose vials of allergens with colour code in graded strength as follows :-

Treatment Set :

Strength 1 Orange Label : 0.01% w/v

Strength 2 Green Label : 0.1% w/v

Strength 3 Blue Label : 1% w/v

Maintenance Set (Blue Label) : 1% w/v

Maintenance dose (Strength 3) was continued for 3 years (2005-2008). Dosage patterns were desired according to patient's sensitivity and tolerance. Dosage were prescribed in the form of drops. Drops were advised to be taken at the same time each day preferably on empty stomach. Drops were kept for 2 minutes below the tongue and then swallowed (Sublingual swallowed method). Doses were administered according to the sensitization pattern. Care was taken to increase the dose at regular interval, however, it could be increased provided the previous dose was tolerable. In case, there was gape, in the treatment schedule

for more than two weeks, therapy was reinitiated (for safety reason) with half of the dose last given. In the event of interruption for more than 4 weeks the therapy was resumed with the initial dose.

Results

Our study showed that sublingual immunotherapy (SLIT) induces significant enhancement of maximum patient (92%) after 1 year of treatment with further improvement in symptoms after 2-3 years of treatment. We found constant improvement of rhinitis score, reduced skin sensitivity and medication used earlier.

No. of children 100
Age between 6 and 12 years

Age	Male	Female
6-8	20	07
8-10	22	10
10-12	30	11

House dust mite is the most common indoor allergen to which children are exposed. As children spent maximum time (80%) at home sensitization to dust mite allergen occurs at a very early stage. Among the children who participated in this study, 72% were male and 28% belonged to female group (Table-1). High representation of male children could be attributed to social factors as in majority of cases the male child gets preference in the family.

The distribution pattern of mite species varies from place to place depending upon climate conditions. Among other mite species *Dematophagoides farinae* and *Dematophagoides pteronyssinus* are known to cause allergic disorders in children. Occurrence of these mite species is found in warm humid climatic conditions. *Blomia tropicalis* is widely

distributed in tropical countries and plays an important role in causation of respiratory allergy.

Formulation of immunotherapy mixture was based on individual sensitivity of different mite species (*D. farinae*, *D. pteronyssinus* and *Blomia tropicalis*). Allergens is graded strengths administered sublingually in all the children for a period of 3 years (2005 to 2008).

During the treatment, no systemic or bronchospastic reactions occurred except irritation of throat and vomiting in 3 subjects. The mean medication score in the treated group reached a statistical significance at the end of treatment. The symptom score and use of medication showed increasing improvement. Where 78% patients were free of symptoms after 3 years of treatment while 14% showed considerable improvement, 4% showed moderate improvement and 4% showed no improvement (Table 2).

The efficacy was measured by patient

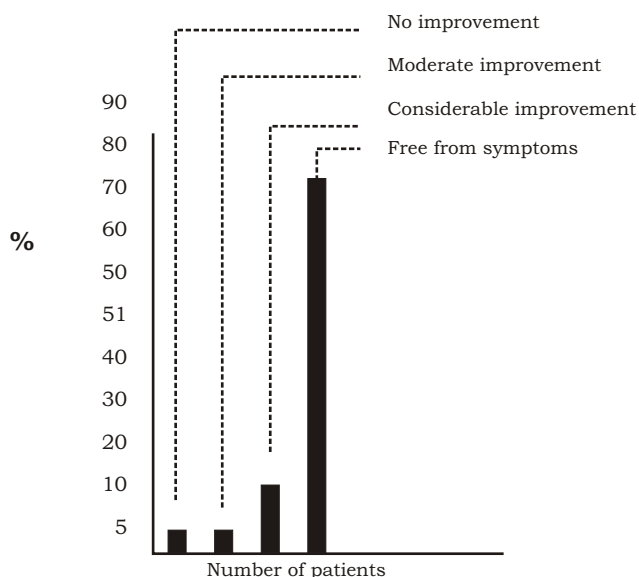


Table-2 efficacy of Sublingual immunotherapy

assessed symptoms scores. Although, nasal, eye, skin and lung related symptoms have been related to house dust mite allergy, the main allergic symptoms were considered to be the following nasal symptoms : Sneezing, itching, watery running nose and blockage. The intensity of these symptoms was subjectively assessed according to a grading scale.

0 = No complaints

1 = Minor complaints

2 = Moderate complaints

3 = Serious complaints

Discussion

Allergen immunotherapy is a choice of treatment in cases where drug treatment is not responding and avoidance is not feasible. Controlled studies and meta analysis have shown that allergens immunotherapy is effective for patients with allergic rhinitis of rhino conjunctivitis, allergic asthma and stinging insects hypersensitivity.⁴

Despite of established efficacy

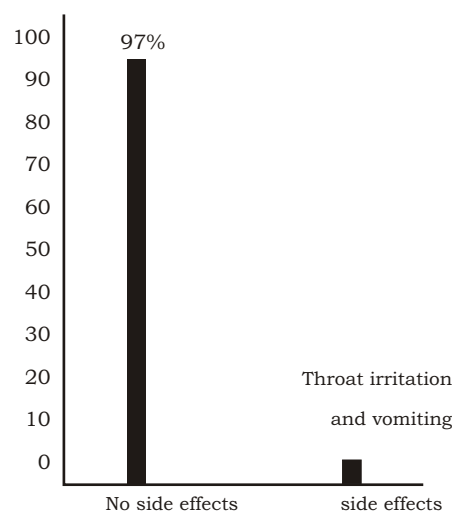


Table-3 Compliance of sublingual immunotherapy

allergens immunotherapy did not gain popularity due to risk of serious side effects especially in children. The main rationale of SLIT is to minimize the risk of adverse events. SLIT is widely considered a valid non invasive alternative to subcutaneous immunotherapy due to less reported side effects and good compliance.

In the present study on 3 subjects suffered from mild throat irritation which was self resolving and mild vomiting. Similar results were reported by Andre *et al*⁵ who advocated good safety profile for SLIT with minimal side effects. In a study, 60 children underwent 4-5 years course of SLIT with standardized extents showed significant difference verses base line for the presence of asthma and use of asthma medications even 5 years after discontinuation of SLIT.

In recent paediatric studies, the occurrence of side effects was reported negligible and they were not troublesome. Noticeably no severe systemic events were reported in the literature during a period of 15 years.⁸

Di Rienzo *et al*⁶ conducted on open study with sublingual immunotherapy and advocated clinical benefits for 5 years after 4 or 5 years of course. Azevedo *et al*⁷ on the basis of results obtained on a meta analysis study reported that the kind of treatment is efficient not only during its administration but after the treatment ceases.

Our results with mite allergens SLIT treatment showed significant reduction in symptoms, medication score with a few side effects only in 3 cases (Table 3). These subjects suffered from mild throat irritation and vomiting. Sporadically itching, headache, rhinorrhoea, constipation and urticaria were also

reported by other authors.⁵

Conclusions

Sublingual immunotherapy could be a noble therapy for allergic disorders in children suffering from dust mite induced rhino-conjunctivitis where avoidance of allergens is impractical, since sublingual immunotherapy is more convenient and has a good safety profile and might be an attractive option for use in primary care.

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