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House dust mite sensitivity is a factor in chronic urticaria

Mahesh PA¹, Kushalappa PA², Holla Amrutha D³, Vedanthan PK⁴

¹ Departments of Pulmonology, JSS Medical College, Mysore, India

² Departments of Dermatology, JSS Medical College, Mysore, India

³ Allergy, Asthma and Chest Center, Mysore, Karnataka, India

⁴ Colorado University of Health Sciences, Denver, Colorado, USA

Correspondence Address:

Mahesh P A

1397, 4th Cross, Krishnamurthypuram, Mysore - 570004, Karnataka
India

maheshapa@sancharnet.in

Abstract

BACKGROUND: Chronic urticaria is one of the perplexing problems faced by clinicians. There are a few reports associating house dust mite sensitivity with chronic urticaria, based upon the patient's history as well as intradermal skin testing and in vitro analysis.

AIMS: To investigate the possible association between house dust mite sensitivity and chronic urticaria. **METHODS:** In this case control study three groups of patients were enrolled. Group I: Chronic urticaria (73 subjects). Group II: Chronic urticaria with collateral allergic disorders (49 subjects). Group III: Normal subjects without chronic urticaria or other allergies (25 subjects). All the patients underwent skin prick testing with antigens of the house dust mite, *Dermatophagoides pteronyssinus* (DP) and *Dermatophagoides farinae* (DF), with positive and negative controls. **RESULTS:** Among the patients with chronic urticaria, 78/122 (64%) patients had skin

Results

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sensitivity to house dust mites. Out of these, 39/73 (53%) had chronic urticaria alone and 39/49 (79%) had chronic urticaria with other associated allergies. Among the normal control subjects, 7/25 (28%) reacted positively to house dust mites. **CONCLUSION:** This study suggests a possible association of house dust mite sensitivity with chronic urticaria.

Keywords: Skin allergies, Chronic urticaria, Skin prick testing, Dermatophagoides pteronyssinus, Dermatophagoides farinae

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Introduction

Chronic urticaria is one of the perplexing problems faced by clinicians. Chronic urticaria is defined as daily or almost daily occurrence of urticarial wheals for at least six weeks.^[1] House dust mites are ubiquitous allergens and common sensitizing agents. Studies from Japan have implicated house dust mite sensitivity in chronic urticaria based on intradermal skin testing and in vitro analysis.^{[2],[3]} A case series supporting this association has been reported by Dixit in the Indian population.^[4] We wanted to study this association using the prick skin test method, which is the standard norm to diagnose clinical sensitivity. We decided to investigate the clinical relevance of house dust mite sensitivity in patients with chronic urticaria in our population.

Methods

After approval from the local institutional review board, patients satisfying the inclusion criteria were enrolled into the study between

2001-2003 at a tertiary allergy center in Mysore, India. The study design was a case control study.

Controls were normal subjects without urticaria or allergies. The inclusion criteria for cases were:

1. Daily or almost daily occurrence of urticarial wheals for at least six weeks with or without collateral allergic disorders.
2. No identifiable cause by clinical evaluation.

Collateral allergic disorders noted included patients with allergic rhinitis (perennial and seasonal), asthma (mild intermittent, mild, moderate and severe persistent), contact dermatitis, drug allergy and conjunctival allergy (seasonal).

The subjects were grouped as:

Group I: Chronic urticaria (73 subjects)

Group II: Chronic urticaria with collateral allergies (49 subjects)

Group III: Normal subjects without chronic urticaria or other allergies (25 subjects).

All the subjects were prick skin tested using a lancet (Bayer) on the forearms using house dust mite antigens (HDM), namely *Dermatophagoides pteronyssinus*, *Dermatophagoides farinae* (10,000 Au/ml), with saline and histamine phosphate as negative and positive controls.[5]

The test results were measured in mm for wheals after 15 minutes. A positive skin test was interpreted as 50% or more compared to the histamine reaction.[6] Complete blood counts, ESR and absolute eosinophil counts were obtained for all patients.

Statistical methods



Case control studies are used to study the association of various factors with the disease.[7] In case control studies, the increase in risk is identified by calculating the odds ratio. The stronger the association between exposure and disease, the higher is the odds ratio. Conversely, if the odds ratio is less than 1, it indicates protection.[8] The positive and negative predictive values were calculated for patients with chronic urticaria alone without collateral allergies.[9]

Results



The study included 147 subjects (122 cases, 25 controls) in the age range of 21-40 years. The demographic data of the study groups are shown in [Table - 1]. The average duration of urticaria was 11.3 months in Group I and 12.6 months in Group II. Routine hematological tests were non-contributory.

Fifty three percent (39/73) of patients in Group I (patients with chronic urticaria alone), and 79% (39/49) in Group II (patients with chronic urticaria and collateral allergies) had a positive prick skin test reactivity to house dust mite antigen. In contrast, 7/25 (28%) normal controls in Group III showed a positive prick skin test reactivity to HDM antigen.

Patients with chronic urticaria alone are 3 times more likely to be sensitive to HDM and patients with both chronic urticaria and collateral allergic disorders are ten times more likely to be sensitive to HDM than the general population [Table - 2] On analysis of data in patients with chronic urticaria alone (Group I), the positive predictive value of house dust mite sensitivity was found to be 53.42% and the negative predictive value was 72%.

Discussion



Our study has shown evidence of an association of house dust mite sensitivity with chronic urticaria using the prick skin testing method. The prick skin testing is clinically more relevant than intradermal testing.[10] Sumimoto,[2] Numata,[3] and Arnold[11] have also shown a significant association between house dust mite sensitivity and chronic urticaria using intradermal and in vitro testing. Dixit from India reported case studies supporting the association of chronic urticaria with house dust mite sensitivity.[4]

The pathogenetic mechanisms of house dust mite-induced chronic urticaria have been elucidated by the pioneering study of Numata et al,[12] which investigated the role of the mite allergen in chronic urticaria. Fifty-two patients with chronic urticaria in whom a cause was not identifiable from the history underwent intradermal skin tests and in vitro antigen-induced histamine release from leukocytes using mite allergen. Thirty patients gave a positive cutaneous reaction to the mite allergen (57.7%). The same study found a direct correlation between skin test reactivity and in vitro histamine release. The authors concluded that patients with chronic urticaria

may be sensitized to mite allergen. Many of these patients had normal serum IgE levels and the authors suggest that cell-bound IgE may be more important than serum IgE levels in patients with chronic urticaria. They have further clarified the route of entry of the house dust mite allergens into the skin tissues to interact with specific IgE on mast cells. The mite allergens could be absorbed through the respiratory or gastrointestinal tracts without any allergic symptoms in these organs. Numata has also discussed the hypothesis of Hannifin that the dust mite antigen could penetrate the stratum corneum based upon its molecular weight. It has been shown that *D. pteronyssinus* allergens can enter the stratum corneum and penetrate into the deeper epidermal layers.[13]

This study shows an interesting relationship between house dust mite sensitivity and chronic urticaria. The presence of collateral allergies in patients with chronic urticaria seems to increase skin test reactivity to dust mites. The mechanisms underlying this relationship in the pathogenesis of chronic urticaria need to be studied further.

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