

THE DEGREE OF SEROLOGICAL SENSITIZATION TO CAT ALLERGEN IN PATIENTS WITH OR WITHOUT CAT AT HOME

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SUMMARY:

Background: The relationship between exposure to cat/ dog in domestic environments and development of allergic sensitization to pet allergens is still controversial.

Objective: To test the role of indirect exposure to cat, we aimed to evaluate the amounts of cat specific IgE in sensitized subjects with or without cat at home.

Methods: Three hundred six adult patients with a previous diagnosis of allergic sensitization to cat allergens (by skin prick test) were enrolled for this study.

Among 306 men and women sensitized to cat (and other allergens), 150 owned a cat for at least 10 years (direct exposure) and 156 had never owned this animal (indirect exposure). An internal questionnaire specifically designed for the study was completed by the same allergists during the screening consultation: the results of skin prick tests, personal and clinical data, periods of symptoms and characteristics of cat ownership were carefully recorded. Specific IgE to cat extract was determined by the Pharmacia CAP System FEIA (Pharmacia Diagnostics, Uppsala, Sweden) and Immulite 2000 (Diagnostic Products Corporation, Los Angeles, USA).

Results: Although specific IgE to cat allergen were significantly higher in patients with cat at home ($F = 42,77$; $p < 0.001$), high amounts of these antibodies were found also in sera of subjects indirectly exposed to cats.

Discussion: The results of our study demonstrate that the degree of serological sensitization to cat allergens may be relevant also in subjects without any direct contact with cats (indirect exposure).

Key-words: Allergic sensitization - Cat allergy - Cat - Bronchial asthma - IgE - Fel d1 - Pet, Rhinitis - Respiratory allergy.

Recent studies have consistently shown a dose-response relationship between the degree of exposure to house dust mite (1), cockroach (2) or mouse (3) allergens and development of allergic sensitization to these allergenic materials in many inner cities of industrialized countries. On the contrary, studies conducted in rural communities have shown a lack of association between an early and close contact of children with farm animals and development of respiratory allergy (4).

The relationship between the exposure to cat/dog allergens in domestic environments and the risk of developing allergic sensitization is less clear. In fact some studies have demonstrated a direct relationship

between the degree of exposure and the prevalence of sensitization to pet allergens (5, 6).

However in the last few years there is consistent evidence that the relationship between exposure to furred pets in domestic environments and the risk of becoming allergic to cat/ dog allergens is not linear (7, 8).

Recently Custovic *et al.* (9) have shown that the prevalence of allergic sensitization to cat in adults was lower when patients were exposed to very low or very high amounts of cat allergens, the majority of cat allergic individuals were exposed to intermediate amounts of cat allergens.

This background emphasizes the role of indirect exposure to pets (in particular cat) in sensitizing process of airways.

In Italy very few studies have evaluated the characteristics of cat sensitivity by using skin prick tests (10), to our knowledge no study have investigated cat sensitivity by using in vitro methods.

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To test the role of indirect exposure to cat, we aimed to evaluate the amounts of cat specific IgE in sensitized subjects with or without cat at home.

MATERIAL AND METHODS

Patients

Three hundred six adult patients with a previous diagnosis of allergic sensitization to cat allergens (by skin prick test) were enrolled for this study. They were selected out from a population of 2789 living in Naples, Alexandria and Verona areas who were consecutively evaluated from September 30, 2001 to December 31, 2003 for respiratory symptoms of a suspected IgE-mediated aetiology. We enrolled also twenty seven subjects sensitized to other allergens but not to cat, and twenty five non-atopic individuals who served, respectively, as atopic and negative controls. Among 306 men and women sensitized to cat (and other allergens), 156 owned a cat for at least 10 years (direct exposure) and 150 had never owned this animal (indirect exposure). An internal questionnaire specifically designed for the study was completed by the same allergists during the screening consultation: the results of skin prick tests, personal and clinical data, periods of symptoms and characteristics of cat ownership were carefully recorded. All patients gave their informed consent before being submitted to blood samples.

■ **Collection of serum samples:** approximately 4 ml of serum was collected from every patient and atopic/negative control and stored at - 20 °C.

■ **Evaluation of cat specific IgE:** specific IgE to cat extract was determined by the Pharmacia CAP System FEIA (Pharmacia Diagnostics, Uppsala Sweden) and Immulite 2000 (Diagnostic Products Corporation, USA) according to the instructions of the manufacturers.

The classification of the amounts of cat specific IgE is the same in both methods.

■ **Statistical analysis:** statistical analysis has been carried out by using variance analysis with one way on media and standard deviations of laboratory data. Moreover Bonferroni's test has also been used.

RESULTS

Although the levels of cat specific IgE were significantly higher in patients with cat at home ($F = 42,77$; $P < 0.001$ with Bonferroni's test $t = 6,540$; $P < 0.05$),

considerable amounts of cat specific IgE were found in sera of patients without any direct contact with cats (indirect exposure) (figure 1).

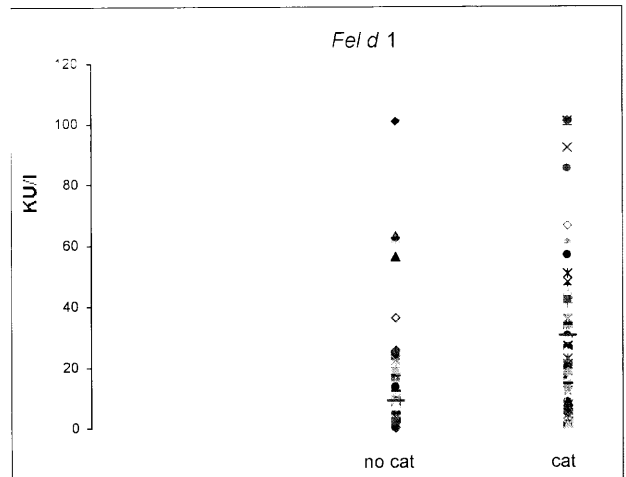


Figure 1: The levels of cat specific IgE according to cat ownership.

DISCUSSION

The results of our study demonstrate that the degree of serological sensitization to cat allergens may be relevant also in subjects without any direct contact with cats (indirect exposure).

Our data emphasize that even the low amounts of cat allergen inhaled as a consequence of indirect exposure are of sufficient magnitude to determine allergic sensitization in susceptible individuals. In fact previous studies have indicated that even the low amounts of cat allergens found in homes without cats may not only induce allergic sensitization, but also trigger respiratory symptoms in highly sensitized subjects (11-13). Moreover it has been suggested that in communities with a significant number of pets, passive exposure may be the primary cause of allergic respiratory diseases induced by animal dander (14).

This is a very important topic because pet allergens, especially those produced by cats) must be now considered as "ubiquitous" being found in many different environments where pets have never been kept (15-17). Recently clothing of cat owners have been indicated as carriers of cat allergens in animal-free environments (18,19). As a consequence of this, the removal of cat allergens from contaminated fabrics has been suggested as the only practicable way to reduce the dispersal of these materials (20-22).

In conclusion our study suggests some main considerations:

➤ In susceptible individuals allergic sensitization to cat can be significantly determined also by the low

amounts of cat allergens inhaled as a consequence of indirect exposure to this animal.

➤ A higher attention should be attributed to the problem of the ubiquity of cat allergens and to the necessity of developing new strategies for controlling the dispersal of these allergens through the clothes of cat owners.

➤ Patients sensitized to cat allergens and not owning a cat should be alerted about this possible modality of sensitization as well as on the necessity of avoiding massive inhalations of cat allergens (for example by entering into indoor environments containing several animals such as pet shops, cat shows etc) (23) to prevent a possible exacerbation of respiratory symptoms.

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