Allergen Levels in Airborne and Surface Dust

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Key Words

House dust mite

Der p I

Der p II

Aero-allergen sampling

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Introduction

The house dust mite *Dermatophagoides pteronyssinus* is widely present in the home. It has been implicated in the provocation of asthma attacks in atopic subjects. The faecal pellets produced by the mite contain one of the major mite allergens *Der p I*. These faecal particles may be inhaled by the patient, and environmental sampling should indicate the quantity.

Although sampling of surfaces within the home gives results related to the presence of allergen in the air, no study has established the nature of the relationship between surface and air mite allergen.

Material and Methods

Air samples were collected from the bedrooms of 62 asthmatic children. Dust was collected from the mattress, duvet and carpet using a Hoover dustette vacuum cleaner for 2 min within a 0.25-m² template and from pillows for 30 s within a 0.06-m² template [1]. A Casella air sampler was clipped to the pillow 12 in from the sleeping child's head. It was switched on before the child went to bed and switched off after rising, each night for a 2-week period, to produce a cumulative sample. Forty-five air samples were collected and the results were expressed as nanograms per cubic metre of air.

Petri dishes (8.5 cm diameter) were pretreated with 2% teleostean gelatine; one was exposed at floor level and one at about pillow height

for 2 weeks [2]. Sixty-one data sets were collected. Data are presented as nanograms per day.

Dust specimens were extracted with PBS/Tween/BSA. *Der p I*, *Der p II* and *Feld I* were measured using a two-site monoclonal antibody ELISA assay [3].

Spearman's correlation coefficient and other non-parametric tests were used for statistical analysis.

Results

Forty percent of air samplers collected *Der p I*, 5% collected *Der p II*. In contrast 85% of the Petri dishes collected *Der p I* and 76% *Der p II*. The median allergen measurements are presented in

table 1 and correlations between airborne and surface sampling are presented in table 2. Plots of Derp I carpet surface content versus air sampling is presented in figure 1.

As there was no significant difference between upper and lower Petri dishes for any of the three allergens, their scores have been added to give a total Petri dish score. Almost all homes without cats had no Fel d1 aero-allergen. Therefore only Fel d1 results for houses with cats are presented (5 air samplers and 7 Petri dish sets).

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3.50

3.00-

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$r_s = 0.32$ $p = 0.012$

Fig. 1. Correlation of surface carpet Derp I versus Petri dish Derp I.

0.00-

0.00

1.00

2.00 carpet Der p I (ng)

3.00

4.00

Table 1. Allergen in air samplers and petri dishes

Discussion

The relationship between surface and air Derp I is significant for carpet and pillow but not close, perhaps because of the high proportion of negative values. An extended collection time could have increased the positives. Petri dishes collecting settled dust provide a cheap easy alternative method for measuring the exposure to mite aero-allergen that a child experiences. The two measures give different relationships between surface and air-collected allergen.

Table 2. Correlations between surface sampling and other types of sampler

Allergen n Correlation coefficient

!p < 0.0001.

*p < 0.05; **p < 0.01; ***p < 0.001

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References

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