

Washing the clothes of cat owners is a simple method to prevent cat allergen dispersal

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Several studies have demonstrated that sensitization to allergens derived from domestic animals, particularly cats, is an important cause of respiratory symptoms and sometimes may constitute a risk factor for asthma exacerbations leading to emergency department visits.¹

The major allergen, Fel d 1, is found in all indoor environments containing a cat²; however, this allergen is also present in dust samples from homes and public places where a cat has never been kept.³ Consequently, not only direct exposure to cats but also indirect contact should be responsible for an allergic sensitization.

Recently, we demonstrated that winter clothes (skirts and trousers) of patients with a cat in the home contain a higher level of Fel d 1 concentration in comparison with those of subjects who have a dog in the home and those of control subjects without animals at home.⁴ As a consequence, clothing may constitute an important means for the distribution of this allergen in cat-free environments and may consequently also represent a risk factor for triggering asthma in cat-sensitized individuals.

In this study we evaluate the effect of washing with water on allergen content of clothing and, consequently, the possibility of preventing cat allergen dispersal.

METHODS

Materials

Twenty-two identical cotton webs (80 × 100 cm) were put in the baskets of 22 male cats for 1 week. Cat owners were asked to change the position of the webs every day to ensure a better contact with the animals. The cotton webs were transferred to our laboratory by using plastic envelopes to avoid the possibility of cat allergen contamination, and dust samples were collected for 5 minutes in a cat-free room.

Each web was divided in two parts (40 × 50 cm). The first part was vacuumed directly, and the second was washed by using only water, dried, and then vacuumed. To exclude cat allergen contamination, five webs not exposed to cats and the indoor environment of our cat-free room were also vacuumed.

High-volume sampling

For the dust collected from cotton webs, we used a high-volume air sampler (CF/20 Gelaire; Flow Labs, Milan, Italy), which consists of a double-head membrane pump connected to two-flow control flowmeters and a volumetric counter. This device works with a constant air flow (20 L/min), and any particulate matter is harvested onto glass fiber filters that are 25 mm in diameter with a pore size of 2 µm (borosilicate microfibre glass with acrylin resin binder, AP 20 Millipore; Milan, Italy). The filters have a measured efficiency of 84% for trapping all particles with a diameter greater than 3 µm. To reduce the risk of contamination, each filter was placed in a sealed separate tube. The device for the dust collection was also kept in a sealed box.

Assay of allergens in vacuumed dust samples

Two milliliters of phosphate-buffered saline with 0.2% bovine serum albumin was added (in eppendorf) to each vacuumed dust sample. After centrifugation for 10 minutes at 10,000 rpm and filtration through a membrane with a 0.45 µm pore diameter, the supernatants obtained were stored at -20° C until allergen assays were performed. Fel d 1 content was determined by using a two-site ELISA. The method was a modification of a previously described radioimmunoassay.⁵

Affinity-purified monoclonal antibody (5/24) was used at a concentration of 10 µg/ml to coat a polystyrene plate. Standard curve (0.2 to 150 ng/ml) was made from a freeze-dried cat dander extract titrated against purified Fel d 1. Standard and samples diluted to the proper concentration were incubated during 2 hours. After washing, biotin-labeled secondary monoclonal antibody (C5/8) was added at a dilution of 1:1000. After incubation and washing, streptavidin peroxidase (Amersham), at a dilution of 1:5000, was added, and the enzymatic activity was evaluated by using o-phenylenediamine dihydrochloride as substrate.

Allergen concentration was estimated from duplicated absorbances of three different dilutions interpolated into the standard curve. The mean intraassay coefficient of variation was lower than 2%, and interassay variation determined over a control was lower than 7%.

Statistical analysis

The evaluation of statistical significance has been carried out by using a repeated-measures analysis of variance on values of

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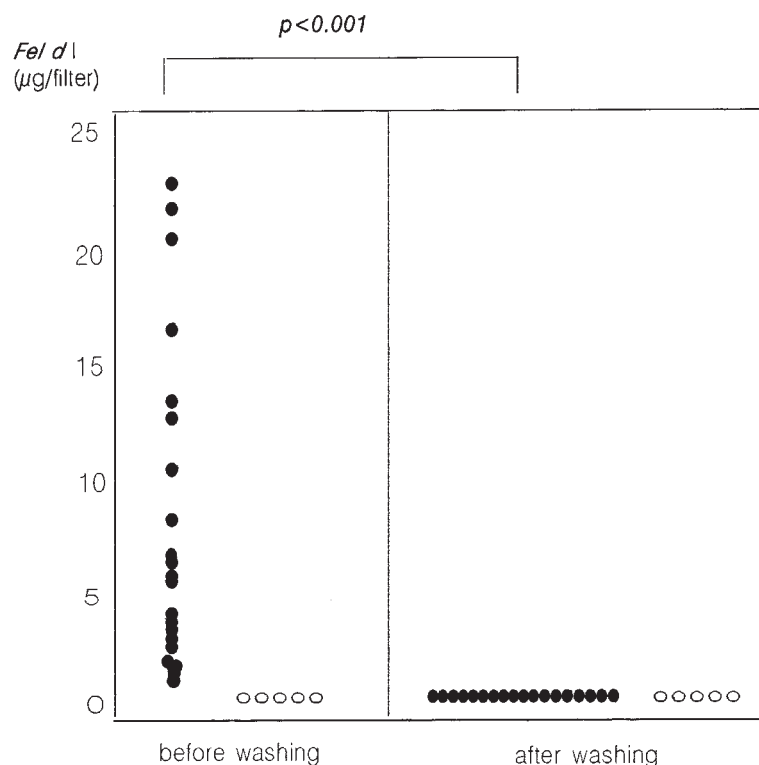


FIG. 1. Fel d 1 allergen concentration (microgram per filter) in 22 cat-exposed cotton webs (filled circles) and five controls (open circles) before and after washing.

Fel d 1. The analysis of variance was followed by Bonferroni's *t* test to detect significant differences among means.

RESULTS

All cotton webs exposed to cats contained different concentrations of Fel d 1 (expressed as micrograms per filter) before washing, and no appreciable presence of the allergen was found after washing ($F = 25.64$, $p < 0.001$; $t = 5.064$, $p < 0.05$). Control cotton webs and the indoor environment of the cat-free room did not contain significant concentrations of Fel d 1 (Fig. 1).

DISCUSSION

The results of our study suggest that washing of allergen-containing cotton fabrics in water is a simple and effective method with which to remove cat allergen from clothing. This procedure, in association with the avoidance of using allergen-contaminat-

ed clothes outdoors, is a means for preventing the dispersal of cat allergen.

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