

Dog Immunotherapy Practices among Allergists

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Abstract

Background: Pet allergens are significant triggers of both allergic rhinitis and asthma.

Objective: It is important to know the practice patterns of allergists treating dog sensitized patients.

Methods: An electronic survey was sent to practicing allergists of the American Academy of Allergy, Asthma, and Immunology (ACAAI). Participants were questioned about their criteria for prescribing dog immunotherapy for patients with allergic rhinitis and asthma. The allergists were asked about the specific type of immunotherapy prescribed, and their opinion regarding the efficacy of dog immunotherapy. Dog allergen reduction strategies were also queried.

Results: 2431 electronic letters were successfully sent, and 537 allergists responded to the survey. The majority of the allergists felt that dog immunotherapy demonstrated some relief of symptoms for allergic rhinitis (92%) and asthma (90%) but that it was not as effective as avoidance of dogs. Most allergists would prescribe dog immunotherapy for veterinarians and patients who were unable or unwilling to remove their dog from the home. Ninety-three percent of respondents recommended removal of the dog from the home, and the majority of allergists (90%) used dog hair and dander for immunotherapy. Common allergen reduction strategies recommended by practicing allergists included restriction of the dog to certain areas of the home (94%), washing of the dog (73%), HEPA filtration (71%), and a HEPA vacuum (46%).

Conclusions: Our survey results indicate that most allergists believe that dog immunotherapy relieves some symptoms of allergic rhinitis and asthma but that it is not as effective as avoidance of dogs.

The opinions or assertions herein are the private views of the authors and are not to be construed as reflecting the views of the Department of the Air Force or the Department of Defense.

INTRODUCTION

Pet allergens are significant triggers for the symptoms of both allergic rhinitis and asthma. In most studies evaluating the triggers of asthma and allergic rhinitis, dog allergy appears to be less common than cat allergy.¹ Nevertheless, dogs can be a potent source of allergen. In some areas of the world the percentage of households with dogs exceeds 50%.^{2, 3} With this widespread prevalence of dog ownership, it would be expected that a significant number of individuals would become sensitized to dog allergens. Dog sensitization rates among patients vary between 4% and 17% in published studies.^{4,5,6}

The first treatment of choice for allergen induced disease is avoidance of the offending allergen. With regard to dog dander, the most effective measure in controlling dog allergens is to persuade the patient not to have a dog. Many pet owners are unable or unwilling to follow this advice. When patients do not remove their dog from the home, other recommendations to control dog dander allergen are typically offered. These include keeping the dog outside, restricting the dog to certain areas of the home, washing the dog, and perhaps using HEPA (high efficiency particulate air) filtration and a HEPA vacuum.

Immunotherapy is also used as a treatment option for patients who have animal dander induced allergic rhinitis and asthma.⁷ There have been several studies evaluating the efficacy of immunotherapy in dog allergic patients.

^{8,9,10,11,12,13} However, most of these trials involved small

numbers of patients, and only a few of these studies were placebo controlled. Also, many of the results of these studies were based on subjective measures.

The purpose of this study was to determine what practicing allergists do when treating dog allergic patients, and their criteria to start dog immunotherapy. We also surveyed opinions of practicing allergists regarding the efficacy of dog immunotherapy.

METHODS

A survey questionnaire was sent via email to 2431 allergists who are members of the American College of Allergy, Asthma, and Immunology (ACAAI) using their survey system. The survey consisted of 12 questions which are shown in Table 1.

Figure 1

Table 1: Questionnaire sent to allergists

1. In which of the following situations, do you prescribe dog immunotherapy for a patient who has definite dog RHINITIS? (May choose none or more than one)
 - A) Veterinarian
 - B) Patient unable to remove their dog from the home for psychological well being
 - C) Any patient who refuses to remove their dog from the home
 - D) Any patient who would be willing to remove their dog from the home
 - E) Any patient with a positive skin test to dog who does not have a pet but is occasionally exposed
 - F) Any patient with a positive skin test, whether or not the patient is symptomatic to dogs
2. In which of the following situations, do you prescribe dog immunotherapy for a patient who has definite dog ASTHMA, with or without rhinitis? (May choose none or more than one)
 - A) Veterinarian
 - B) Patient unable to remove their dog from the home for psychological well being
 - C) Any patient who refuses to remove their dog from the home
 - D) Any patient who would be willing to remove their dog from the home
 - E) Any patient with a positive skin test to dog who does not have a pet but is occasionally exposed
 - F) Any patient with a positive skin test, whether or not the patient is symptomatic to dogs
3. Do you recommend removal of the dog from the home? Yes/No
4. What kind of dog extracts do you use for immunotherapy?
 - A) Dog hair and dander
 - B) Something else, (please write in response) _____
5. What concentration of dog extract do you prescribe for maintenance dog immunotherapy? (Please write in answer and include units)
6. Which of the following allergen reduction strategies do you recommend? (May choose more than one)
 - A) Washing of the dog
 - B) HEPA filtration
 - C) Restriction of the dog to certain areas of the home
 - D) Special (HEPA) vacuum
 - E) Other _____
7. If you checked "Washing of the dog" above, how many time per week do you recommend washing the dog? _____
8. In one year, how many new patients do you see for allergic disease?
 - A) 0
 - B) 1-100
 - C) 100-1000
 - D) >1000
9. In one year, what percentage of new patients do you place on dog immunotherapy?
 - A) <1%
 - B) 1-10%
 - C) 10-25%
 - D) >25%
10. Based on your practice experience, how effective is dog immunotherapy for RHINITIS?
 - A) As effective as avoidance
 - B) Not as effective as avoidance
 - C) There is some relief of symptoms
 - D) Not at all
 - E) No experience with immunotherapy in this situation
11. Based on your practice experience, how effective is dog immunotherapy for ASTHMA?
 - A) As effective as avoidance
 - B) Not as effective as avoidance
 - C) There is some relief of symptoms
 - D) Not at all
 - E) No experience with immunotherapy in this situation
12. What is your training and current practice experience? (Please check all that apply)
 - A) Academic practice
 - B) Private practice
 - C) Board certified in Allergy/Immunology
 - D) Trained at Wilford Hall Medical Center
 - E) Trained at Walter Reed Medical Center

RESULTS

We sent 2431 surveys to members of the ACAAI, and received 537 responses which equates to a 22% response rate. Eighty two percent of respondents work in private practice and 18% work in an academic setting. Eighty percent of the respondents were board certified in Allergy & Immunology.

The majority of the respondents (71.7%) stated that they evaluate between 101 and 1000 new patients each year. Fifty one percent of allergists noted that they place 1% to 10% of their new patients on dog immunotherapy. There was little consensus among allergists as to the concentration of dog

extract prescribed for maintenance dog immunotherapy. Responses ranged from 1:10 weight per volume to 1:500 weight per volume. Of the write-in responses for this question, 104 allergists out of 427 (24.3%) reported that they used 1:100 weight per volume, followed by 1:10 weight per volume (56 out of 427 allergists-13.1%) and 35 out of 427 (8.1%) allergists used 1:20 weight per volume concentration of dog extract (Table II).

Figure 2

Table 2: Maintenance dog immunotherapy concentrations reported

1:10 weight/volume	13.1%
1:20 weight/volume	8.1%
1:50 weight/volume	6.0%
1:100 weight/volume	24.3%
1:200 weight/volume	1.8%
1:1000 weight/volume	1.6%

The majority of the allergists felt that dog immunotherapy demonstrated some relief of symptoms for allergic rhinitis (91.9%) and asthma (89.6%) but that it was not as effective as dog avoidance. Most allergists would prescribe dog immunotherapy for veterinarians and patients who are unable or unwilling to remove their dog from the home. The majority of allergists would not prescribe dog immunotherapy for patients who were willing to remove their dog from the home (Table III). Of the allergists surveyed, 90% used dog hair and dander for immunotherapy. Specifically, of the 50 allergists that wrote in a response, 22 (44.0%) stated that they used acetone precipitated dog hair and dander extracts for immunotherapy, and one allergist stated that he used alum precipitated dog extracts.

Figure 3

Table 3: Patients treated with dog immunotherapy for rhinitis and asthma

	Rhinitis	Asthma
Veterinarian	86%	86%
Patient unable to remove dog from home for psychological well being	81%	81%
Patient who refuses to remove dog from home	68%	73%
Patient who would be willing to remove dog from home	24%	36%
Patient with dog positive skin test who does not have a pet but is exposed	40%	50%
Patient with positive skin test, whether or not is symptomatic to dogs	11%	15%

Ninety-three percent of respondents recommended removal of the dog from the home. Common allergen reduction strategies recommended by practicing allergists to those patients who were unable to remove their dog from the home included restriction of the dog to certain areas of the home (93.9%), washing of the dog (73.1%), HEPA filtration (71.0%), and a HEPA vacuum (45.9%) (Table IV). Among allergists recommending that patients wash their dog, the majority of the allergists (95.0%) suggested that patients wash their dog once to twice a week.

Figure 4

Table 4: Allergen reduction strategies

Washing the dog	73%
HEPA filtration	71%
Restriction of dog to certain areas of the home	94%
Special (HEPA) vacuum	46%

DISCUSSION

There have been two previous surveys published evaluating the practice habits of allergists for the treatment of animal dander allergy. One survey of 79 allergists completed in 1987 by Grammer et al. ¹⁴ revealed that the majority of allergists would use immunotherapy to treat veterinarians or people for whom their cat or dog was important for psychological reasons. The majority, however, would not administer immunotherapy to patients who were willing to get rid of their pet or did not have pets. The responses did not significantly change among allergists if the patients had rhinitis or asthma symptoms upon exposure to their pet. The allergists that responded to the questionnaire felt that pollen immunotherapy was more efficacious than animal dander immunotherapy. Most of the allergists thought that animal dander immunotherapy produced significant amelioration of symptoms.

Another survey of 170 allergists done in 1979 by Baker ¹⁵ revealed that 50% uniformly recommended that pets be eliminated from allergic households even if the patient does not exhibit allergic symptoms to the pet. Of those same allergists, 49% felt that patients did not follow their instructions. Approximately 70% of the allergists reported that they considered animal dander immunotherapy beneficial. ¹⁰

Our survey has several key points that need to be emphasized. First, our survey focused primarily on the treatment of dog allergy and did not include cats or other animals. Second, because of the convenience of electronic

mail and the use of the ACAAI's survey system, we were able to survey a large group of allergists (537). To our knowledge, this is the largest survey that has been accomplished regarding the treatment of patients with dog allergic rhinitis and allergy.

For those patients with dog-related allergic rhinitis and asthma, most of the allergists surveyed would prescribe immunotherapy for veterinarians and patients who are unable or unwilling to remove their dog from the home. In addition our survey showed that the majority of allergists would not prescribe dog immunotherapy to patients who are willing to remove their dog from the home. Our survey also showed that the likelihood of using dog immunotherapy did not significantly differ whether or not the patients had symptoms of allergic rhinitis or asthma. These results are similar to the results from the study by Grammer et al.¹⁴

Other results of our survey show that a large majority of the surveyed allergists recommend removal of the dog from the home. If the patient is unwilling or unable to remove their dog from the home, other recommendations include restriction of the dog to certain areas of the home, washing of the dog and HEPA filtration. One allergist stated in reference to washing of the dog, "I only recommend that the dog is washed by other family members since there appears to be notable worsening of symptoms while a dog is still wet or drying."

Other answers given by allergists to reduce the amount of indoor dog allergen include trimming the hair of the dog short, using a special animal dander shampoo, and having a small dog as opposed to a large one. Some allergists even recommend "Allerpet," which is a cleaning solution to apply to your dog in order to reduce the amount of allergen. Additional recommendations include grooming or brushing the dog outside, giving the dog oral fatty acids to decrease dog antigen, removing carpet from the home, steam vacuuming, and using an electrostatic filter. There was some pessimism expressed by one allergist who noted that patients will not comply with any of the dog allergen reduction strategies.

There are been several studies looking at dog allergen reduction strategies. Hodson et al.¹⁵ evaluated hair clippings and dander samples from 25 dogs and used ELISA to measure Can F 1 (major dog allergen) levels. They demonstrated that washing the dog reduces dog allergen levels but stated that the dog needs to be washed at least twice a week to maintain a modest reduction in the airborne

level of Can f 1 in homes with a dog. Green et al.¹⁶ investigated the effect of a HEPA air cleaner in nine homes with a dog and concluded that HEPA air cleaners reduce airborne levels of Can f 1. The authors also stated that preventing access of the dog to the bedroom and living room may reduce the total allergen load inhaled by patients. Francis et al.¹⁷ studied the effects of using an air cleaner and a HEPA filter vacuum cleaner in adult asthmatic patients sensitized and exposed to pet allergens (cats and dogs) and found a beneficial response in 10 of 15 patients after 12 months of intervention. Popplewell et al.¹⁸ discovered that Can f 1 was reduced in the mattress samples of 60 homes after using HEPA vacuum cleaners as compared to standard vacuum cleaners.

Allerpet, which is a spray promoted to cleanse an animal's hair of dander and saliva thus reducing the allergen, was recommended by a few allergists as a method to reduce dog allergen. Allerpet has been investigated in several studies looking at cat allergen. An abstract by Koren et al.¹⁹ stated that cat allergen in settled dust from houses with cats was reduced by the use of Allerpet on the cat. However, Klucka et al.²⁰ measured the amounts of Fel d 1 shed from 24 female mongrel cats during an 8 week treatment period and reported no significant reduction in the major cat allergen Fel d 1 after treatment with Allerpet. Finally, Perzanowski et al.²¹ measured the Fel d 1 concentration by ELISA removed from 10 cats treated with Allerpet and found that the amount of Fel d 1 removed was fivefold less than the quantity that can be removed from washing a cat. In addition, the authors stated that wiping the cat with Allerpet is not more effective in removing allergen than wiping the cat with a wet cloth. Unfortunately there have not been any studies looking at the efficacy of Allerpet in reducing dog allergen.

In our survey, the majority of the allergists felt that dog immunotherapy demonstrated some relief of symptoms for allergic rhinitis and asthma but that it was not as effective as avoidance of dogs. Many studies have been undertaken looking at the effectiveness of dog immunotherapy. The first report of dog immunotherapy came in 1967 when Tuft and Torsney²³ treated 17 patients with an alum-precipitated dog extract. The patients reported having a definite increase in tolerance to the exposure of dogs after 3-10 months of immunotherapy; however the results were based on clinical observations from likely biased patients.

The first double blind study involving dog immunotherapy was reported in 1984 by Valovirta et al.⁸ who studied 27

children (15 patients in the treatment group and 12 in the placebo group). After 6-8 months of immunotherapy, decreased sensitivity to dog was noted in 53% of the treatment group and in 50% of the placebo group. After 10-12 months of therapy, conjunctival sensitivity and skin sensitivity to dog antigen decreased, and dog specific IgG antibodies increased significantly in the immunotherapy treated group as compared to the placebo group.²⁴

Additional studies looking at the efficacy of dog immunotherapy followed. Sudlin et al.⁹ treated seven patients with dog allergen immunotherapy for 1 year but noted no significant changes in clinical symptoms and bronchial challenges as compared with placebo. Bucor et al.¹³ gave 11 patients dog allergen immunotherapy for 1 year and noted a significant decrease in specific IgE, conjunctival and skin sensitivity, and an increase in dog specific IgG. In 1989, Lilja et al.¹¹ reported the results of a 2 year study of cat and dog immunotherapy and stated that the effects of dog immunotherapy as measured by bronchial challenges, skin testing and serum specific IgG and IgE were not as pronounced in the dog immunotherapy group as compared to the cat immunotherapy treated group. Hedlin et al.¹² performed a 3 year study of cat and dog dander extract immunotherapy where 21 patients received cat immunotherapy and 11 subjects received dog immunotherapy. Allergen and skin sensitivity decreased significantly in both treated groups, but bronchial hyperreactivity only decreased in the cat-allergen treated patients prompting the authors to conclude that dog immunotherapy was not as efficacious as cat immunotherapy. Overall from these studies, it appears that cat immunotherapy is more efficacious than dog immunotherapy, but there needs to be larger placebo controlled studies that focus on the effectiveness of dog immunotherapy.

In summary, our survey results indicate that most allergists believe that dog immunotherapy relieves some symptoms of allergic rhinitis and asthma, but it is not as effective as avoidance of dogs. For veterinarians and those patients unable or unwilling to remove their dog from the home, the majority of allergists would prescribe dog immunotherapy for their patients with symptoms of allergic rhinitis and asthma.

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References

1. Kjellman B, Pettersson R. The problem of furred pets in childhood atopic disease. Failure of an information program. *Allergy* 1983; 38:65-73.
2. Haahtela T, Bjorksten F, Heiskala M, et al. Skin prick test reactivity to common allergens in Finnish adolescents. *Allergy* 1980; 35(5):425-431.
3. Ingram JM, Sporik R, Rose G, et al. Quantitative assessment of exposure to dog (Can f 1) and cat (Fel d 1) allergens: Relation to sensitization and asthma among children living in Los Alamos, New Mexico. *J Allergy Clin Immunol* 1995; 96:449-456.
4. Lin RY, La France J, Sauter D. Hypersensitivity to common indoor aeroallergens in asthmatic patients. *Ann Allergy* 1993; 71(1): 33-39.
5. Barbee RA, Brown WG, Kaltenborn W, et al. Allergen skin-test reactivity in a community population sample: correlation with age, histamine skin reactions, and total serum immunoglobulin E. *J Allergy Clin Immunol* 1981; 68:15-19.
6. Murray AB, Ferguson AC, Morrison BJ. The frequency and severity of cat allergy vs. dog allergy in atopic children. *J Allergy Clin Immunol* 1983; 72(2):145-149.
7. Hedlin G, Graff-Lonnevig V, Heilborn H. Immunotherapy with cat- and dog-dander extracts V. Effects of 3 years of treatment. *J Allergy Clin Immunol* 1991; 87:955-964.
8. Valovirta E, Koivikko A, Vanto T. et al. Immunotherapy in allergy to dog: A double-blind clinical study. *Annals of Allergy* 1984; 53:85-88.
9. Sundin B, Lilja G, Graff-Lonnevig V, et al. Immunotherapy with partially purified and standardized animal dander extracts. *J Allergy Clin Immunol* 1986; 77(3):478-487.
10. Hedlin G, Graff-Lonnevig V, Heilborn H, et al. et al. Immunotherapy with cat-and dog-dander extracts II. In vivo and in vitro immunologic effects observed in a 1-year double-blind placebo study. *J Allergy Clin Immunol* 1986; 77(3):488-496.
11. Lilja G, Sundin B, Graff-Lonnevig V, et al. Immunotherapy with cat-and dog-dander extracts IV. Effects of 2 years of treatment. *J Allergy Clin Immunol* 1989; 83(1):37-44.
12. Hedlin G, Graff-Lonnevig V, Heilborn H, et al. Immunotherapy with Cat- and Dog-dander extracts V. Effects of 3 years of treatment. *J Allergy Clin Immunol* 1991; 87(5):955-964.
13. Bucur J, Dreborg S, Einarsson R, et al. Immunotherapy with dog and cat allergen preparations in dog-sensitive and cat-sensitive asthmatics. *Ann Allergy* 1989; 62(4):355-361.
14. Grammer LC, Shaughnessy MA, Shaughnessy JJ, et al. Practices in cat and dog immunotherapy among allergists. *NER Allergy Proc* 1987; 8:253-258.
15. Hodson T, Custovic A, Simpson A, et al. Washing the dog reduces dog allergen levels, but the dog needs to be washed twice a week. *J Allergy Clin Immunol* 1999;103:581-585.
16. Green R, Simpson A, Custovic A, et al. The effect of air filtration on airborne dog allergen. *Allergy* 1999;54:484-488.
17. Francis H, Fletcher G, Anthony C, et al. Clinical effects

of air filters in homes of asthmatic adults sensitized and exposed to pet allergens. *Clin Exp Allergy* 2003;33(1):101-105.

18. Popplewell EJ, Innes VA, Lloyd-Hughes S, et al. The effect of high-efficiency and standard vacuum-cleaners on mite, cat and dog allergen levels and clinical progress. *Pediatr Allergy Immunol* 2000;11(3):142-148.

19. Koren LG, Janssen E, Willemse A. Cat allergen avoidance: a weekly cat treatment to keep the cat at home (abstract). *J Allergy Clin Immunol* 1995;95:322.

20. Klucka CV, Ownby DR, Green J, et al. Cat shedding of Fel d 1 is not reduced by washings, Allerpet-C spray, or acepromazine. *J Allergy Clin Immunol* 1995;95:1164-1171.

21. Perzanowski MS, Wheatley LM, Avner DB, et al. The effectiveness of Allerpet/c in reducing the cat allergen Fel d 1. *J Allergy Clin Immunol* 1997;100:307-312.

22. Baker E. A veterinarian looks at the animal allergy problem. *Ann Allergy*. 1979;43(4):214-216.

23. Tuft L, Torsney PJ. Experience in the hyposensitization treatment of animal dander allergic patients with alum-precipitated pyridine extracts. *Am J Med Sci*. 1967;253(1):19-22.

24. Valovirta E, Viander M, Koivikko A. Immunotherapy in allergy to dog. Immunologic and clinical findings of a double-blind study. *Ann Allergy*. 1986;57(3):173-179.

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