
Rush immunotherapy in a dog with severe ragweed and grass pollen allergy

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Background: Forty years of study of naturally occurring IgE-mediated allergy in animals is briefly reviewed. These studies provided models for study of bioactive mediators and innovative pharmacologic therapies for IgE-mediated asthma.

Objective: Based on our experience with canine allergy we evaluated and treated a dog with severe grass and ragweed allergy whose allergic dermatitis was uncontrolled by H₁ blockers and topical corticosteroids. The dog was miserable during the Chicago grass and ragweed pollen seasons.

Methods: Rush immunotherapy was initiated during the ragweed season of 1997.

Results: Dramatic improvement was seen which persisted through the grass and ragweed seasons of 1998 after maintenance immunotherapy.

Conclusion: The case is presented not as a model for canine immunotherapy but as an example of how animal research can be of value to both animals and humans.

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INTRODUCTION

The occurrence of immediate type allergic reactions in dogs was reported in 1949 by Wittich.¹ Subsequently one of us began studying canine allergic reactivity in 1959.² A Northwestern University colony of allergic dogs was established.³ We attempted to establish an inbred colony of atopic dogs but were unsuccessful. Subsequent efforts of studies of naturally occurring allergy in animals focused on both dogs and rhesus monkeys, particularly studies on asthma in rhesus monkeys and their value in pharmacologic studies.⁴

The initial dog studied² was a terrier who spent 2 years at the University of Michigan and 5 years at Northwestern University, enjoyed working with laboratory personnel and was awarded a citation as Dog Hero of the Year in

1959 in Michigan. She is shown in Figure 1A with author RP. This terrier succumbed due to geriatric health problems at about age 13.

The case to be presented here is a Jack Russell Terrier who became progressively worse with grass and ragweed allergy until her owner decided intense therapy was necessary. She is shown in Figure 1B, with her owner (RP).

Case Report

The Jack Russell Terrier was obtained from a breeder who said some allergic problems had occurred in various relatives. In May 1996, the dog began to have highly pruritic erythematous dermatitis which disappeared at the end of the Chicago grass pollen season but returned in mid-August and persisted through the duration of the Chicago ragweed pollen season and then disappeared. The primary IgE-mediated allergic reaction in dogs is often a highly pruritic dermatitis with ocular and nasal symptoms of lesser importance.⁴

The dog was puncture tested to histamine, mixed grass pollen and short ragweed extracts at her home. [Anesthesia was not required because of the dog's trust in her owner (Fig 1B)]. Grass, ragweed, and histamine puncture tests were positive in 15 minutes. A saline control was negative. Brom-

fed and topical steroids were started but chlorpheniramine 0.5 mg had to be substituted for Bromfed which made an already excitable dog more excited. The antihistamine and topical corticosteroids controlled the dermatitis in 1996.

In 1997 moderate symptoms returned during the grass pollen season and were again controlled with chlorpheniramine and topical corticosteroids. Symptoms disappeared after the grass pollen season but returned on August 15, 1997, far more severe than the previous ragweed season of 1996. Antihistamine and topical corticosteroid therapy failed to control the symptoms and the dog was miserable with continuous scratching, biting her skin, and then secondary bacterial infections. Her symptoms were markedly exacerbated by expeditions through fields and woodlands. Jack Russell Terriers are hunting dogs and working in fields was important to the dog's contentment and sense of happiness. The severity of the dermatitis is shown in Figure 2. Immunotherapy was started by the dog's owner (RP) with the hope that the severity of the grass and ragweed pollinosis could be reduced.

Injections were given daily with epinephrine available. The injections were not noticed by the dog since she received them subcutaneously while aggressively eating her dinner. After 1 week of daily injections, injections were given twice daily. Treatment was given by the dog's owner who had experience with human allergen immunotherapy, canine allergen immunotherapy, and rush immunotherapy. The dog's co-owner encouraged this approach.

The immunotherapy protocol used during the 1997 and 1998 grass and ragweed seasons is shown in Table 1.

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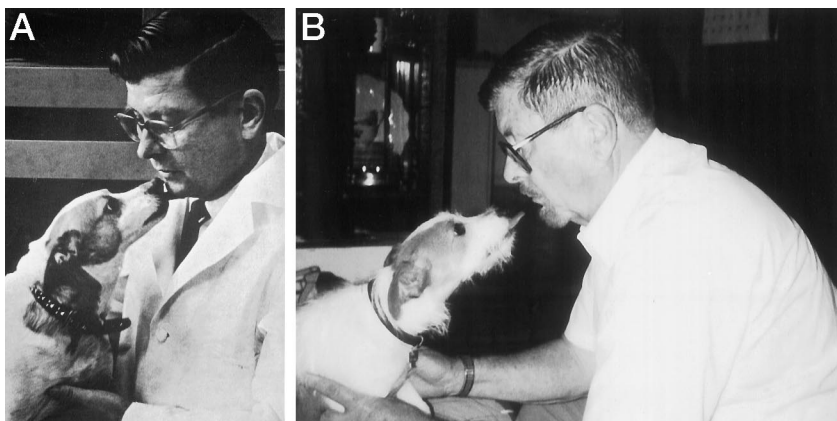


Figure 1. A. Initial dog studied showing canine allergic reactivity shown here with author RP. B. Jack Russell terrier undergoing rush immunotherapy shown with author and owner RP.

Within 1 week of initiation of the daily injections the severity of the symptoms began to subside and after 2 weeks of starting immunotherapy there was marked improvement even though this was the peak period of the ragweed pollen season in Chicago. Hunting trips to woodlands were continued but were not followed by exacerbations of the dermatitis. The injections of grass and ragweed extract were con-

tinued but were given less frequently and were continued at monthly intervals during the winter and then given weekly intervals when symptoms reappeared during the summer grass season. The dog had no symptoms during the grass and ragweed seasons of 1998 and the immunotherapy injections were discontinued at the end of the ragweed season of 1998. There were no systemic or local reactions during



Figure 2. Illustration of the severity of allergic dermatitis in dog prior to receiving rush immunotherapy.

the entire course of immunotherapy. If recurrence of the allergic problems appear in 1999 therapy will be resumed and probably discontinued after the summer of 2000.

DISCUSSION

Studies of allergic antibodies in dogs, rhesus monkeys, and humans indicated that IgE antibodies in dogs and monkeys were in the IgE immunoglobulin class⁵ previously described in humans by Ishizaka.⁶⁻⁷

Injection of ragweed antigen in dogs has resulted in induction of antibodies that were not IgE but had a protective effect against canine IgE antibody-mediated reactions.⁹ This "blocking antibody" is probably analogous to the human IgG antibody response in man, one logical explanation for the effect of allergen immunotherapy.¹⁰

The use of rush immunotherapy has been described in humans as early as 1930¹¹ with subsequent reports demonstrating techniques and potential usefulness.¹²⁻¹⁶ A similar potential may exist for canine allergen rush immunotherapy. It must be recognized that the canine immunotherapy was given in the home by an allergist very experienced in allergen immunotherapy and the treatment of anaphylaxis. We are not recommending rush immunotherapy by dog owners anymore than we would recommend rush immunotherapy at home for human subjects by non-medically trained family members.

The emphasis of this report should be that research conducted in animals can advance knowledge and be of value to both humans and animals. We feel this is well demonstrated by a recent discovery which has potential for modification of IgE-mediated allergic diseases.¹⁷

We report this case as a successful approach in a single animal with rush immunotherapy. Allergen immunotherapy in veterinary medicine is an established practice and we include references for those interested in a broader approach to veterinary allergy.¹⁸⁻²³ These reports further document

Table 1. Immunotherapy* Protocol for Grass and Ragweed

Day	PNUs/mL	Volume (mL) Injected	Day	PNUs/mL	Volume (mL) Injected
1	5†	0.10	14	500	0.05
2		0.20	15		0.10
3		0.30			0.15
4		0.35	16		0.20
5		0.45	17		0.25
6		0.60			0.30
7		0.80	18		0.35
8	50	0.05			0.45
9		0.10		5000	
10		0.15	19		0.05
11		0.20			0.10
12		0.25	20		0.15
		0.30			0.20
13		0.40	21		0.25
					0.30
			22‡		0.35
					0.40 maintenance

* Immunotherapy schedule: daily injections subcutaneously. Epinephrine available.

† Approximate. Stock extracts used were non standardized extracts at 1:10 wt/vol.

‡ After day 22, volume of 1:100 was kept at 0.40 and intervals gradually increased to 2,3,4,5,7,10,14,19,23,28, and 30 days and maintained at 30-day intervals until the grass season of 1998 and then given weekly through the 1998 ragweed season and discontinued.

that the major IgE-mediated reaction in dogs is dermatitis²⁴⁻²⁸ not nasal and ocular symptoms.

Finally, although this is a single case, we feel it is of value. Single cases can be of value, as you know in causes of anaphylaxis and in therapy.

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