J. BIOL. ENVIRON. SCI.,
2011, 5(14), 87-89

Intradermal Testing Results and Clinical Features in Dogs with Atopic Dermatitis in Turkey

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ABSTRACT

This study was designed to evaluate the relationship between clinical signs and intradermal skin test results and the prevalence of causative allergens. A total of 50 dogs of different breeds, ages and sexes (26 male and 24 female) were used as material. After clinical examination and ruling out other disease based on diagnostic work-up, IDT (Intradermal testing) were performed on the dogs suspected of atopy. The 16 allergens used in the study were selected based on a previous study. All the dogs in the study had one or more positive reactions to the allergens used in the IDST. The positive reaction ratios were: 70% (n: 35) for lambs wool, 66% (n: 33) for house dust mites, 46% (n: 23) for cotton, 48% (n: 24) for fleas, 32% (n: 16) for human epithelium, and 24% (n: 12) for *Penicillum notatum.* According to the IDST, there was no positive reaction to beech. It was concluded that Willemse's criteria correlated with history and that clinical findings are important in the diagnosis of cases with suspected atopy. IDST results should thus be considered as the "gold standard" in the diagnosis of atopy and the identification of offending allergens.

Key Words: Atopy, dermatitis, Ig E, skin, allergen, test.

INTRODUCTION

In dogs, atopic dermatitis (AD) is the most commonly encountered skin disease and is characterized by skin pruritis and eczematous dermatitis, and an inherited tendency to develop IgE antibodies in response to environmental allergens (Scott et al., 2001). Numerous environmental allergens have been incriminated in the pathogenesis of canine AD. The typical age of onset of canine AD is reported to be between 6 months and 3 years (Griffin 1993; Saridomichelakis et al., 1999; Scott et al., 2001).

The typical clinical signs of AD are pruritus on the face, ears, paws, extremities, and/or ventrum. Any one or any combination, or all of these areas can be affected (Nesbitt et al., 1978; Scott 1981). For diagnosis, Willemse's criteria of major and minor features of canine AD currently enjoy widespread acceptance. Utilizing these criteria, AD can be diagnosed by a combination of history, clinical signs and intradermal skin tests; in vitro tests are also important tools for the diagnosis of AD (Willemse 1986).

The aim of this study was to deterimine the incidence of positive intradermal skin test reactions and clinical features in dogs with AD.

MATERIALS AND METHODS

A total 50 dogs were selected according to Willemse's criteria from dogs admitted to the Universty of Uludag, Faculty of Veterinary Medicine, Internal Medicine Clinic between 2003 and 2005. These dogs were not given any oral antihistamine or immunosuppressant before or during the study. The diagnosis of AD was made by a combination of compatible history and clinical signs along with the presence of one or more positive IDST. Other possible diseases were eliminated using diagnostic tools (culture, skin scraping, elimination diets). A total of 16 aqueous allergenic extracts (Greer®, Lenoir, North Carolina, USA) were selected for intradermal skin tests. All allergens were transferred to 1-cc insulin syringes with 27-gauge intradermal needles. A solution of 0.9% Na Cl (0.09%, Isotonic NaCl®, Dexter, Eczabasi Inc., Istanbul, Turkey) and histamine phosphate at a concentration of 1/100,000 (w/v) were used as the negative and positive control, respectvely. All dogs were sedated with xylazine (0.5–1 mg/kg, IM, Alfazyn). A total of 0.05 ml of each allergen, negative and positive control solution was injected intradermally into one clipped area on the lateral thorax. Intradermal skin test results were interpreted 15 min after injection and were subjectively graded on a scale of 0–4 according to the approximate diameter, height, firmness and erythema of the wheal. The negative control was graded as 0 and the positive control was graded as 4.

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RESULTS

Twenty-six (52%) and 24 (48%) of the 50 dogs were intact males and intact females, respectively. The age of the dogs at the time of presentation ranged between 1 and 11 years At admission, 7 (14%) dogs had family history. Fleas were observed on 6 (12%) of the dogs and the clinical signs had been present for longer than one year in 27 (54%) of the cases according to the owner.

The positive reaction rates against allergens were 70% (n: 35) for lambs wool, 66% (n: 33) for house dust mites, 46% (n: 23) for cotton, 48% (n: 24) for fleas and 32% (n: 16) for human epithelium. According to the IDT, there was no positive reaction against beech. Timothy, stinging nettle, willow, plane tree, oak, beech, *Aspergillus fumigatus*, *Penisillum notatum*, flea (1000 PNU/ml), house dust mite *(Dermatophagoides farina)*, lambs wool, cottonseed, cat epithelium, dog epithelium, human epithelium, and feathers (500 PNU/ml) were used as allergens.

DISCUSSION

In the present study, the history and clinical signs of the cases were found to be compatible with Willemse's criteria (Willemse 1986). Pre-diagnosis of atopy, made on the basis of these criteria, was confirmed by IDT.

In the present study, itching was seen in all cases, supporting the traditional data (Scott et al., 2001). In atopic dogs, itching is usually observed on the face, soles, distal extremities, forefeet and ventral regions (Mason 1995; Scott et al., 2001). In the present study, itching was concentrated on the ears, face and interdigital areas and was generalized in 16% of cases.

Table 1 Percent of clinical localizations and lesion type in atopic dogs.

Localization	**Number**	**Percent (%)**
Pruritis on face and ears	**37**	**74**
General pruritis	**8**	**16**
Interdigital erythema and pruritis	**26**	**52**
Abdominal pruritis and erythema	**18**	**36**
Effect on metacarpal and metatarsal joint	**23**	**46**
Sacral lepruritis or lesion	**5**	**10**
Lesion type		
Crustematous lesion	**2**	**4**
Hyperpigmentation	**10**	**20**
Erythema	**29**	**58**
Superfascial pyoderma	**26**	**52**
Generalized alopecia	**1**	**2**

The house dust mite is the most commonly encountered allergen in AD (Saridomichelakis et al., 1999; Bond et al., 1999; Saevik et al., 2003). In the present study, the house dust mite had the highest positive reaction rate. The rate of positive response against the flea antigen was higher than that in other studies (Helliwell and Longino 1985; Shick and Fadok 1986) but was similar to the results of earlier studies (Helliwell and Longino 1985; Shick and Fadok 1986). The reason for this higher reaction against fleas might be that the study was carried out in the summer and may also indicate ineffective flea control.

In the present study, positive responses against herbal allergens were lower than those against other allergens (14% oak, 12% willow, 6% plane tree, 6% stinging nettle, 2% mixed). In dogs, reaction against different antigens shows great variability (Nesbitt 1978; Bond 1994; Koch and Peters 1994; Codner and Tinker 1995; Kırkpınar 1998; Saridomichelakis et al., 1999). This may reflect differences in geographical habitation and life style. This was supported by a higher positive response against oak than the other allergens in the present study.

In this study, a low positive rate of reaction was detected against mixed herbal antigens and it is suggested that this was because the dogs taken to our clinic were house dogs and were not often walked close enough to areas in which they would come into contact with herbs.

In the present study, lower positive response rates were obtained against *Aspergillus fumigatus* and *Penicillum notatum* than against the other allergens in the allergy panel. In a study by Nesbit (1978), a positive reaction against mixed fungi was reported in 88% of cases. It is suggested that the low reaction rate against this allergen might be associated with the dogs' environment. The lower positive reaction rate

compared to rates determined in the past both in men (Helliwell and Longino 1985) and in animals (Nesbitt 1978; Masuda et al., 2000) might also be associated with changed in warm-up vehicles and hygiene.

Human, cat and dog epithelium, , lambs wool, mixed feathers and cottonseed are not confined to a particular geographic area but are widespread. In this context, variation in the positive response against certain antigens that are not confined to a definite area might be explained by the differences in the life habitat and the life style as individually. Such variation might also be associated with the dosage of the antigens used in studies and irritant reactions.

Finally, it was concluded that the high rate of skin-test reactivity to house dust mites indicates that sensitivity to *D. farinae* should be considered as a potential cause of canine AD. Additionally, in the diagnosis of suspected atopy, when correlated with history and clinical signs, Willemse's criteria have an undeniable significance and IDST should be considered as the "gold standard" for the identification of offending allergens.

Table 2. Age of onset, breeds, seasonality, number of allergens in IDST for each case, number of positive reactions in atopic cases.

Age onset (years)			Breeds		Seasonality			
1-5			Terrier, G. retriever, Mixed breeds, L, retriever, G. shepherd, Boxer, Anotolian Sheep-dog, Rottweiler and Huskie		Non-seasonal pruritus	Seasonal 54%		
1-2 (56%)	2-3 (20%)	4-5 (24%)			(46%)	34.7% spring	21.7% autumn	43.4% summer
Number of allergens in IDST					Positive reactions			
one	two	three	four	five or more	+ and ++		+++ and ++++	
8%	16%	26%	14%	36%	138		60	

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