

## EPIDEMIOLOGY OF ATOPIC DISEASES IN DOGS IN SLOVAKIA DURING 1995-2000

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*Intradermal allergen diagnostic tests were carried out in 152 dogs of different breeds, ages and sex using the ARTUVETRIN TEST SET intended for diagnosis of atopic disease.*

*Examination of the dogs revealed the highest incidence of atopic disease in German shepherd dogs (19%), poodles (9%), boxers (4.6%), cocker spaniels (4%), terriers (4%), Dalmatians (3.3%), Shar pei dogs (3.3%), chow-chow (3.3%), and cross-breeds (13.8%). Fifty four atopic dogs belonged to an additional 31 breeds (1-3 dogs in each).*

*With regard to the sex, 60.5% involvement was recorded with males and 39.5% with females. In 20.4% of the dogs the disease was observed before reaching the age of one year, in 62.5% between 1 and 3 years old, in 13.8% between 4 and 6 years old and in 3.3% in dogs above 6 years of age.*

*Positive reactions to weed pollen occurred in 12.5%, to grass pollen in 9.9%, to tree pollen II in 4.6%, and to tree pollen I in 2.0% of the dogs tested.*

*Tests for reaction to mites showed that 77.6% of the dogs were positive to *Dermatophagoides farinae*, 64.5% to *Tyrophagus putrescentiae*, 49.3% to *Acarus siro*, 30.3% to *Lepidoglyphus destructor*, and 6.6% to *Dermatophagoides pteronyssinus*.*

*Positivity to epithelial allergens of humans, cats and dogs was observed in 21.7%, 15.8%, and 10.5% of cases, respectively.*

*Sensitivity to 1 allergen was detected in 15.1%, 2 allergens in 21.1%, 3 allergens in 23.7%, 4 allergens in 27.6%, and to 5 allergens in 8.6% of cases. Four dogs showed positive reactions to 6 allergens and two to 7 allergens.*

*Key words: allergens, allergy, dermatitis, dogs, intradermal allergen test.*

## INTRODUCTION

Atopy in dogs is an inherited disease characterised by production of specific IgE antibodies to environmental antigens, such as plant pollen, mites, epithelium, and others. The most important clinical manifestation of this disease is a seasonal or all the year round pruritus. Atopy is an important group of diseases because of its dominant place in the complex of allergic skin diseases (Muller *et al.* 1989, Pralaud and Olivry 1998).

First clinical symptoms of the disease are observed already in the pre-pubertal period although most cases (approx. 70%) are recorded between 1-3 and 6 years of age (Carlotti and Costargent 1992, Koch and Peters 1994, Magdus 1996).

Atopic disease has been observed in many breeds, not excepting cross-bred dogs. However, as a genetic predisposition to its development has been identified, its incidence is higher in particular breeds than others. In European countries, genetic predisposition to this disease was observed in German shepherd dogs, poodles, boxers, terriers, English bulldogs, Irish setters and retrievers (Willemse 1986, Öhlan 1992, Carlotti and Costargent 1992, Koch and Peters 1994, Hamann *et al.* 1996).

The definitive diagnosis of atopy in dogs is based on complex evaluation and compatibility of anamnestic data, clinical symptoms, differential diagnostics, and a positive intradermal skin test (IDST) or *in vitro* ELISA test (Willemse *et al.* 1984, Willemse 1991, Muller 1993, Tan and Halliwell 1998). Current clinical practice prefers IDST to *in vitro* testing due to the frequent occurrence of false-positive results with the ELISA system.

Of the seasonal allergens in European countries the highest occurrence of positive reactions was observed to weed pollen as well as grass and tree pollen. Among the most important non-seasonal allergens, *Dermatophagoides farinae* ranks first with regard to the number of positive reactions, followed by household dust and human and animal epithelium (Willemse *et al.* 1984, Vollset 1985, Öhlan 1992, Carlotti and Costargent 1992, Hamann *et al.* 1996, Magdus 1996).

Multisensitivity occurred in 56-92% of the dogs tested (Öhlan 1992, Magdus 1996).

The aim of the present study was to prepare a comprehensive epidemiological analysis of atopic diseases in dogs in Slovakia in the period of 1995-2000.

## MATERIAL AND METHODS

The evaluated group of animals consisted of 152 atopic dogs examined at an outpatient's department of the 1st Internal clinic of the University of Veterinary Medicine in Kosice during 1995-2000.

Intradermal tests were conducted using allergens of Dutch provenience ARTUVETRIN TEST SET intended for diagnosis of atopy in dogs (Table 1).

Table 1. ARTUVETRIN TEST SET □ *in vivo* testing of allergens

|                                       |  |
|---------------------------------------|--|
| Grass pollen mixture                  | Bermuda grass, Orchard grass,<br>Sweet vernal grass, Timothy and<br>Velvet grass |
| Tree pollen mixture I                 | Birch, Alder and Hazel   |
| Tree pollen mixture II                | Oak, Beech and Elm   |
| Weed pollen mixture                   | Common mugwort, Stinging nettle,<br>Dandelion and English plantain               |
| <i>Dermatophagoides farinae</i>       | Mites  |
| <i>Dermatophagoides pteronyssinus</i> | Mites  |
| <i>Lepidoglyphus destructor</i>       | Mites  |
| <i>Tyrophagus putrescentiae</i>       | Mites  |
| <i>Acarus siro</i>                    | Mites  |
| Cat epithelium                        |  |
| Dog epithelium                        |  |
| Human epithelium                      |  |

The tests that were designed to confirm the suspected allergens or atopic disease were carried out according to the following scheme:

- the intradermal allergen diagnosis was performed following detailed anamnesis, clinical and laboratory examination and differential diagnostics,

- before the testing, all drugs capable of affecting the results of IDST, such as antihistaminics, corticosteroids, tranquilizers, and other anti-inflammatory and immunosuppressive drugs were excluded,

- the IDST was conducted according to the procedure recommended by the producer of the diagnostic test (ARTU Biologicals N.V., Lelystad, The Netherlands),

## RESULTS

The highest breed-related incidence of atopic disease in the group of 152 patients tested was observed in German Shepherd dogs 29, (19%), poodles 14, (9%), boxers 7, (4.6%), cocker spaniels 6 (4%), terriers 6 (4%), Dalmatians 5 (3.3%), Shar-pei dogs 5 (3.3%) and chow-chow 5 (3.3%). A high incidence of the disease was recorded also in cross-breds 21 (13.8%). The remaining 54 patients were dogs of other breeds with 1-3 atopic dogs per breed.

With regard to sex positive results were obtained in 92 males (60.5%) and 60 females (39.5%).

The first disease symptoms in relation to age were observed as follows: in 31 dogs at less than 1 year of age (20.4%), in 95 dogs at 1- 3 years old (62.5%), in 21 dogs at 4-6 years old (13.8%), and in 5 dogs over the age of 6 years (3.3%).

The results of intradermal allergen diagnostics in 152 atopic dogs are presented in Table 2.

Table 2. Results of intradermal test in 152 atopic dogs

| Allergens                             | Positive reaction | in % |
|---------------------------------------|-------------------|------|
| Grass pollen mixture                  | 15                | 9.9  |
| Tree pollen mixture I                 | 3                 | 2.0  |
| Tree pollen mixture II                | 7                 | 4.6  |
| Weed pollen mixture                   | 19                | 12.5 |
| <i>Tyrophagus putrescentiae</i>       | 98                | 64.5 |
| <i>Dermatophagoides farinae</i>       | 118               | 77.6 |
| <i>Lepidoglyphus destructor</i>       | 46                | 30.3 |
| <i>Dermatophagoides pteronyssinus</i> | 10                | 6.6  |
| <i>Acarus siro</i>                    | 75                | 49.3 |
| Dog epithelium                        | 16                | 10.5 |
| Cat epithelium                        | 24                | 15.8 |
| Human epithelium                      | 33                | 21.7 |

The positivity to seasonal allergens showed the following distribution: 19 were positive to weed pollen (12.5%), 15 to grass pollen (9.9%), 7 to tree pollen of group II (4.6%) and 3 to tree pollen of group I (2.0%).

Of all positive reactions caused by mites 118 cases were ascribed to *Dermatophagoides farinae* (77.6%), 98 to *Tyrophagus putrescentiae* (64.5%), 75 to *Acarus siro* (49.3%) and 46 to *Lepidoglyphus destructor* (30.3%). The lowest number of positive results 10 (6.6%) was associated with *Dermatophagoides pteronyssinus*.

Sensitivity to 1 allergen occurred in 23 dogs (15.1%), to 2 allergens in 32 dogs (21.1%), 3 allergens in 36 dogs (23.7%), 4 allergens in 42 dogs (27.6%), and to 5 allergens in 13 dogs (8.6%). Four dogs showed reactions to 6 allergens and two to 7 allergens (Table 3).

Table 3. Multisensitivity in 152 tested dogs

| Number of reactions                      | 1    | 2    | 3    | 4    | 5   | 6   | 7   |
|--|------|------|------|------|-----|-----|-----|
| Number of dogs positive to 1-7 allergens | 23   | 32   | 36   | 42   | 13  | 4   | 2   |
| Dogs positive to 1 - 7 allergens (%)     | 15,1 | 21,1 | 23,7 | 27,6 | 8,6 | 2,6 | 1,3 |

## DISCUSSION

According to our observations, similarly to Vollset (1985), Öhlén (1992), Hamann *et al.* (1996) and others, atopic diseases affect many dog breeds including cross-breeds.

With regard to the sex our results confirm the statement of Magdus (1996) about the higher incidence of atopy in male dogs.

The incidence of disease in relation to age showed some difference between our findings and the results of other authors. Of the examined dogs 20.4% atopic animals were younger than one year of age. This proportion is considerably higher than that reported by Magdus (1996) who found 9% incidence of atopic disease in this age category. The difference may be caused by the differences in housing conditions, resistance of the dogs, and intensity of negative influences in the environment. It seems that providing veterinary information to owners and the resulting ability to recognize disease symptoms may play an important role.

Dynamic interpretation of the results obtained for other age categories corresponds to the data presented by Willemse (1984), Öhlén (1992), and Carlotti and Costargent (1992) for age categories between 1-3 and 4-6 years of age with the highest incidence at the age of 1-3 years. In our study we observed 62.5% incidence in the 1-3 year old category and 13.8% incidence in dogs 4-6 years old.

The number of positive reactions to seasonal allergens differs in individual European countries (Carlotti and Costargent, 1992, Hamann *et al.*, 1996, Magdus, 1996, and others). However, complex summarisation shows that grass pollen is involved in 4-21% (9.9% positivity in our study), tree pollen in 4-19% (2% positivity to tree pollen I. and 4.6% positivity to tree pollen II, as observed in our study), and weed pollen in 3-32% of cases (12.2% involvement in our study).

It is therefore obvious that the positivity to seasonal allergens observed in our study corresponded to the lower half of the global range.

With regard to mites, Préalaud (1990) and others observed the highest occurrence of positive reactions with *Dermatophagoides farinae*. Our results confirmed this observation as 77.6% of the positive cases in our study were caused by this mite.

Evaluation of positivity to human epithelium showed 21.7% occurrence which is a lower proportion than that reported by Carlotti and Costargent (1992) - 35.1%, and Willemse *et al.* (1984) - 39.8%. With regard to the positivity to dog epithelium our results (10.5%) are close to the 9% positivity reported by Carlotti and Costargent (1992).

Our results on multisensitivity (84.8% of the cases tested) are closest to the 80% multisensitivity reported by Vollset (1985).

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#### EPIDEMIOLOGIJA ATAPIJE PASA U SLOVAČKOJ U PERIODU 1995-2000

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#### SADRŽAJ

U ovoj studiji su izneti rezultati intradermalnih testiranja 152 psa različitih rasa, uzrasta i pola Aruvin test setom u cilju postavljanja dijagnoze atopije kod ove životinjske vrste. Atopija je najčešće dijagnostikovana kod nemačkih ovčara i pudli a u većoj frekvenci se pojavljivala kod mužjaka. Najčešći alergeni koji su doveli do atopije su poreklom od grinja.