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Canine atopic/allergic dermatitis in Mashhad (North-East of Iran): clinical observations

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Summary

The aim of this study was to elucidate the prevalence of canine atopic/allergic dermatitis in Mashhad (North-East of Iran) in a hospital-population of dogs and to evaluate its clinical features according to the diagnostic criteria of the disease by Willemse and Prélaud. Among 111 canine patients with dermatologic problems, admitted to Ferdowsi University of Mashhad, Veterinary Teaching Hospital between October 2007 and October 2008, atopic/allergic dermatitis was diagnosed in a total of 8 dogs by combining the compatible historical evidence and clinical signs and the seasonality of the clinical signs. The affected dogs consisted of 2 males and 6 females (females predisposition). Terriers were the most often represented breeds (6/8), which is mainly because of overrepresentation of this breed in our hospital. The age of the dogs when presented varied from 6 months to 4.5 years (median: 1.7 years). Pruritus, the outstanding clinical sign in all the 8 dogs, was either localized (5/8) or generalized (3/8). Most of the animals (6/8) had non-seasonal pruritus. Skin lesions were generalized (64%) or localized (36%), involving the head, the ear flaps, the neck, the lateral and dorsal aspects of the body trunk, the axillae and ventral chest, the abdomen and inguinal region, the perineum and the feet. Otitis externa, seen in 3/8 cases, was unilateral (1/3) or bilateral (2/3), either non-exudative or purulent.

Key words: Dog, Atopic/allergic dermatitis, Pruritus, Clinical criteria

Introduction

Canine atopic dermatitis (CAD) is defined as a hereditary, IgE and/or IgGd mediated hypersensitivity to environmental allergens that is clinically characterized by pruritus with or without accompanying skin lesions (Scott *et al*., 1995). It is the most common allergic skin disease of the dog, perhaps with the exception of flea allergic dermatitis, (DeBoer, 1989; Carlotti and Costargent, 1994; Scott *et al*., 1995), reportedly affecting 3-15% of the canine population (Scott and Paradis, 1990; Reedy *et al*., 1997). The available knowledge on the epidemiology of CAD is limited, and more studies within this area are in demand according to the International Task Force on canine atopic dermatitis (Hillier and Griffin, 2001). From the few published reports, it would appear that CAD will be seen commonly by general practitioners and accounts for a significant percentage of cases presented to dermatologists in referral practices. Additional studies are needed to characterize the prevalence of CAD and to monitor the suspected rising incidence, so that clinicians may be aware of the commonality of CAD, and to stimulate further research in this disease (Hillier and Griffin, 2001). There is no definitive diagnostic test for the disease, and it is diagnosed on the basis of the elimination of other pruritic skin diseases and the fulfillment of certain clinical and historical criteria (Willemse, 1986). The main clinical sign of CAD is pruritus, particularly of the face, ears, paws, extremities and/or ventrum (DeBoer and Hillier, 2001). Hence, before a diagnosis is made it is important to rule out other pruritic diseases like flea allergic dermatitis, sarcoptic mange and other

ectoparasites, bacterial pyoderma, *Malassezia* dermatitis, cutaneous adverse food reactions, contact dermatitis and disorders of keratinisation (Scott *et al*., 1995; DeBoer and Hillier, 2001). The aim of this study was to expand the clinical knowledge on CAD, to determine the prevalence of CAD in our hospital-population of dogs and to compare them with those reported from other countries. To establish the diagnosis of atopic dermatitis, criteria according to Willemse (1986 and 1988) and criteria by Prélaud *et al*. (1998) were used.

Materials and Methods

Patient selection

A total of 111 canine patients with dermatologic problems admitted to our hospital between October 2007 and October 2008 comprised the animal population of the study.

Diagnostic evaluation

After obtaining a detailed history, a thorough clinical and dermatological examination was done in all 111 dogs. All pruritic dermatoses that could mimic CAD (such as infestation of parasites and infection of bacteria or fungi) were excluded through multiple skin scrapings for ectoparasites, ivermectin trial therapy for sacroptic mange and direct microscopy plus fungal cultures for dermatophytes. Microscopic examination of skin scrapings was also used for approximate establishment of bacterial and *Malassezia* infections or cytologic examination of the lesions.

Patients suspect of food allergy (hypersensitivity) - clinically, very similar to CAD - were fed an elimination diet for six to eight weeks (Jeffers *et al*., 1991; Paterson, 1995) with a following testing of individual components of formerly presented foods. Food hypersensitivity was excluded based on the negative result by a food elimination test.

The diagnosis of CAD was made after fulfillment of Willemse criteria and/or Prélaud criteria and exclusion of other similar pruritic disorders (Park *et al*., 2000). In the case of clinical criteria by Willemse the patient must comply with at least three main and three related criteria. The main criteria include pruritus, facial or digital involvement, lichenification of flexor surfaces of the tarsus or extensor surfaces of carpus, chronic or chronically relapsing dermatitis, individual or family history of atopy and breed predisposition. The associate criteria include first signs of disease before the third year of life, facial erythema and cheilitis, bacterial conjunctivitis, surface staphylococcus pyoderma and hyperhidrosis. Criteria by Prélaud *et al*. (1998) include five clinical criteria, of which the patient must fulfill at least three: pruritus reacting to application of glucocorticoids, erythema of the pinnae, bilateral erythematous pododermatitis of the forelimbs, cheilitis and first signs of disease at the age between six months and three years.

In many cases the typical clinical signs of the disease were obscured by previous therapy and therefore all medicaments were withdrawn for at least two to three weeks.

The recorded diagnosis was graded on a four point scale (Nødtvedt *et al*., 2006) ranging from (1) "Possible atopic" to (4) "Other skin diseases" (Table 1).

Results

Dogs with pruritus dermatoses

Among 111 canine patients with dermatologic problems admitted to Ferdowsi University of Mashhad, Veterinary Teaching Hospital between October 2007 and October 2008, 49 canine patients found to suffer from pruritus - clinically characterized by pruritus with or without accompanying skin lesions (Scott *et al*., 1995) as shown in Fig. 1.

Dogs with atopic/allergic dermatitis

Willemse criteria

According to Willemse criteria (1988), the required number of clinical criteria was met by 6 out of 49 patients with pruritic dermatoses - 5.40% of the whole number of 111 canine patients with any kind of dermatologic problems. Forty three patients with pruritic dermatoses did not meet these clinical criteria.

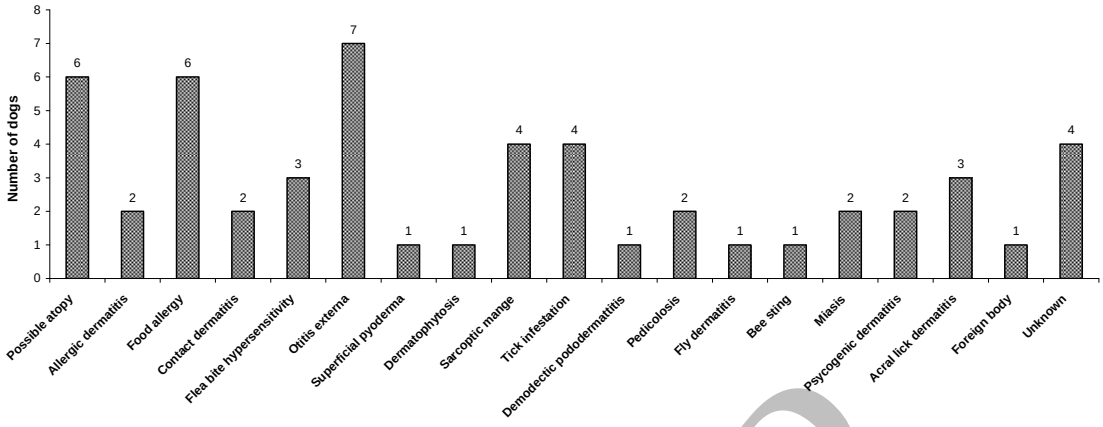

Fig. 1: Differential diagnosis of 49 examined dogs with pruritus*. The number of pruritic patients in each category, sum to more than the total number of pruritic patients because three patients with "possible atopic dermatitis" also had otitis externa

Prélaud criteria

According to the criteria by Prélaud *et al*. (1998), there were 8 patients in the group with atopic dermatitis - 7.20% of the whole number of 111 canine patients with any kind of dermatologic problems - and 41 patients that did not meet the criteria for atopic dermatitis.

Classification of dogs according to four point scale (Nødtvedt et al., *2006)*

All 49 dogs included in the analysis were graded on four point scale as shown on Fig. 2. According to classification made by Nødtvedt *et al*. (2006), 8 dogs were diagnosed to suffer from atopic/allergic dermatitis (Table 2). The affected dogs consisted of 2 males and 6 females. Terriers were the most often represented breeds (6/8), which is mainly because of overrepresentation of this breed in our hospital. The age of the dogs when presented varied from 6 months to 4.5 years (median: 1.7 years). A familial history for atopy was obtained in 2 cases. Pruritus, the outstanding clinical sign in all the 8 dogs, was either localized (5/8) or generalized (3/8). Most of the animals (6/8) had non-seasonal pruritus. However, seasonal pruritus could not be determined in 2 dogs that had been pruritic for less than one year. Skin lesions were generalized (64%) or localized (36%), involving the head (51%), the ear flaps (51%), the neck (10%), the lateral and dorsal aspects of the body trunk (45%), the axillae and ventral chest (45%), the abdomen and inguinal region (37%), the perineum (25%) and the feet (72%). The cutaneous lesions that were seen in 7/8 atopic/allergic dogs, most commonly consisted of erythema (87%) (Fig. 3), hyperpigmentation (62%), traumatic hypotrichosis (55%), crusting (54%), papules (42%), traumatic alopecia (33%), lichenification (32%), excoriations (29%), scaling (29%) and thick skin (29%). Acute pyotraumatic dermatitis was noticed in 3 cases. Otitis externa, seen in 3/8 cases, was unilateral (1/3) or bilateral (2/3), either non-exudative (1/3) or purulent (2/3). Cytology of the otic discharge revealed substantial numbers of *Malassezia pachydermatis*, cocci, rods and degenerative neutrophils, in various combinations.

Treatment efficacy of atopic/allergic dogs

The efficacy of each treatment modality was not possible to be assessed, because they had been used in various combinations. Nevertheless, all the 8 dogs that were medicated with glucocorticoids showed an excellent response. The clinical signs reappeared in 6 of them very soon or as long as 2 months after drug discontinuation. The remaining two animals did not experience any relapse because of the use of Atopica® (cyclosporine; Novartis Animal Health US, Inc.) (unpublished data).

Discussion

Due to the variability of clinical signs of

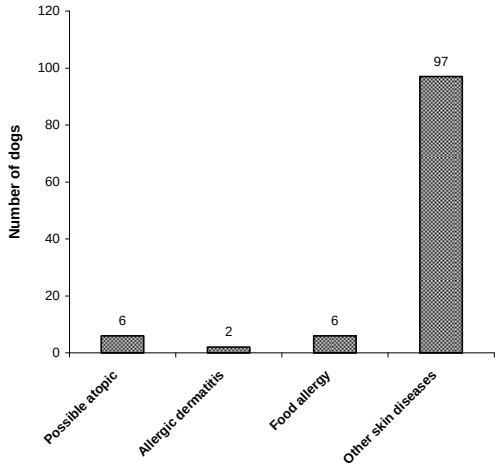

Fig. 2: Classification of 111 dogs with dermatologic problems, based on the criteria listed in Table 1

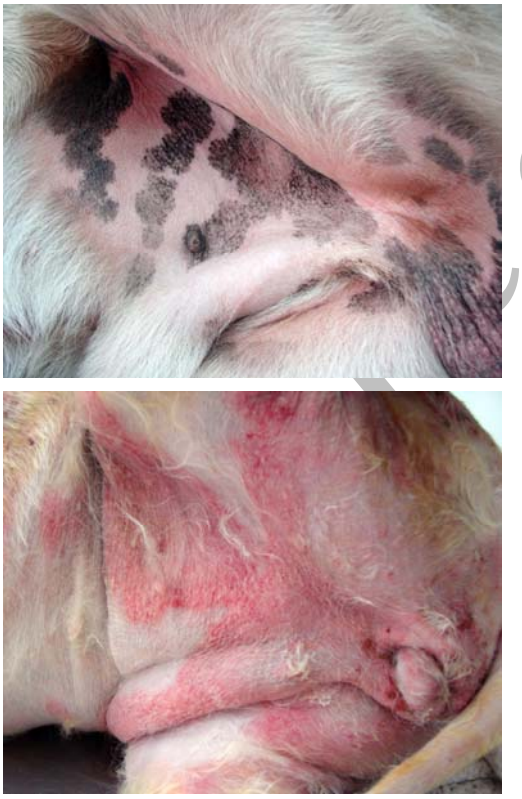

Fig. 3: This terrier dog had intense pruritus and erythematous dermatitis on the ventral abdomen

atopic dermatitis in the individual patients, using only one criterion cannot be considered reliable enough (DeBoer and Hillier, 2001). In this study we used two lists of clinical criteria which have been arranged by Willemse (1988) and Prélaud *et al*. (1998). The diagnosis of CAD was made after fulfillment of Willemse criteria and/or Prélaud criteria and exclusion of other similar pruritic disorders (Park *et al*., 2000). However, it must be kept in mind that the manifestations of CAD are highly variable between individuals and a patient that fails to fulfill these criteria may still actually be atopic.

The age span of the patients with atopic dermatitis was in accordance with data in the literature (Nesbitt *et al*., 1984; Griffin, 1993; Scott *et al*., 1995; Saridomichelakis *et al*., 1999), ranging between six months to 7 years (median: three years). Most of patients were in the age category from six months to three years (6/8). However, 2 patients with more than three years were referred from other veterinary practices with history of long-term persisting skin problems, so that the true onset of this disease appeared at a younger age.

The results of this study, as well as those of North America (Scott, 1981; Schick and Fadok, 1986) demonstrate females predisposition for atopic/allergic dermatitis although four other similar European studies (Willemse and van den Brom, 1983; Vollset, 1985; Carlotti and Costargent, 1994; Saridomichelakis *et al*., 1999) did not demonstrate any sex predilection.

Clinical signs were very variable, and only pruritus was diagnosed in all patients. At the examination of the atopic patients according to the criteria by Willemse (1988), 6 cases were found as positive and 2 cases did not fulfill these criteria. Although the clinical criteria are numerous in comparison with Prélaud, some criteria seem not to have sufficient evidence value. One of the main criteria is individual or familial history. This indicator is difficult to find objectively, because it is often based on inaccurate information of the owners or cannot be obtained at all, and thus the number of the principal criteria decreases to five. Chronic or relapsing pyoderma does not describe exactly cases that are characterized only by development of the atopic dermatitis, especially in young patients or in case of the primary eruption of atopic patient. From the accessory clinical criteria the expression "staphylococcal pyoderma" is rather incorrect, because it is already partly

included in the principal criteria, and a patient with pyoderma without exact history thus fulfills two criteria by one clinical sign (Počta and Svoboda, 2007). Clinical criteria by Willemse do not consider cases with only local lesions (atopic dermatitis with primary eruption, i. e. these patients showed only pruritus and had no secondary lesions with developed pyoderma yet), so that confined development of clinical signs can lead to incorrect diagnosis.

According to the clinical criteria by Prélaud included in the group of patients with atopic dermatitis were 8 dogs and 103 dogs did not fulfill the criteria for inclusion. These criteria do not consider some cases; when a patient is presented at an older age and the history of onset of disorders reported by the owner is not exact, the choice for the four remaining criteria is lower. Administration of corticoids does not always result in control of pruritus; in some patients, corticoid administration at the time of presentation in a veterinary practice may be contraindicated because atopic patients can suffer from deep pyoderma, Malassezia pyoderma currently with demodicosis or mange (Počta and Svoboda, 2007). Cheilitis was not observed in our group of the atopic patients as a frequent clinical sign (1/8). Moreover, it may not have been properly interpreted by the examining veterinarian.

In this study, total hospital-prevalence of atopic/allergic dermatitis (according to four point scale) was 7.20%. In an early report, the prevalence of CAD, at large was estimated to be 15% (Chamberlain, 1974). More recently, in textbooks, estimates of 3-15% (Reedy *et al*., 1997) and around 10% (Scott *et al*., 2001) have been stated. Some insights can be gained from studies that have assessed the prevalence of CAD in dogs relative to all other diagnoses (cutaneous and non-cutaneous disease), all other skin diseases, and other pruritic skin diseases. In a recent study of 31,484 dogs examined by veterinarians in 52 private veterinary practices in the US, 8.7% of the dogs were diagnosed with atopic/allergic dermatitis, allergy or atopy (Lund *et al*., 1999). In a survey of skin diseases seen at 17 veterinary teaching hospitals, 8% of 11,456 cases were diagnosed with allergy (CAD, food allergy or allergic dermatitis, but excluding flea allergy dermatitis) (Sischo *et al*., 1989). Further analysis of the data presented by Lund *et al*. (1999), indicates that dogs diagnosed with atopic/allergic dermatitis, allergy or atopy accounted for 21.6% of the dogs that were diagnosed with any "skin or ear disease". It should be noted that the data reported by these studies are likely to be variably affected by geographical region, survey methodology, type of veterinary practice (general practice, private dermatology referral practice, and university referral practice), study population selection, and criteria for establishing the diagnosis of CAD and other diseases. In addition, the true prevalence of CAD is difficult to determine as: (1) mild cases are often successfully managed with symptomatic therapy without a specific diagnosis being made; (2) some clinical manifestations of CAD are not recognized by owners or veterinarians as being part of CAD (e.g. chronic otitis, bacterial and *Malassezia* infections); and (3) there are no documented reliable methods to demonstrate that clinical disease is induced by allergen exposure in dogs with allergen hypersensitivity (Hillier and Griffin, 2001).

As only 3 flea allergic dogs were seen during the study period, it seems that atopic/allergic and food allergy are the most common canine allergic skin diseases in Mashhad (north of Iran), as it happens to be elsewhere in Europe (Carlotti and Costargent, 1994), while the opposite is true in most parts of USA (DeBoer, 1989). In our case, this observation could be explained by the low humidity, especially during the warm periods of the year, not favoring flea development. However, the relatively small number of the cases studied and the widespread use of anti-flea medication do not allow us to draw solid conclusions on the real prevalence of canine allergic skin diseases in the canine population of our region.

Pruritus, the most prominent clinical sign in atopic/allergic dermatitis, was non-seasonal in the majority of our patients (6/8), as in most of the other reports (Scott, 1981; Nesbitt *et al*., 1984; Vollset, 1985; Scott *et al*., 1995).

One of the most important aspects in diagnosis of any dermatological disease is a thorough review of signalment and history

in each case, and this certainly holds true in leading the clinician towards the diagnosis of atopy in dogs. It is only after ruling out other causes of pruritus that may mimic atopy that one should begin to consider this diagnosis. This is one of the most critical steps in leading the practitioner to diagnosis of atopy, as it is well established that the IDST (Intra Dermal Skin Test) are capable of giving false-positive results in clinically normal dogs. Among veterinary dermatology/allergy specialists, it is still widely agreed that the most important component in establishing this diagnosis is an evaluation of the history and clinical signs and the systematic ruling out of other possible causes of pruritus (Marsella, 2006).

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