Abstract
The aim of the study was to determine a diagnostic approach to atopy in cats based on clinical features and to identify the factors responsible for the development of allergy on the basis of intradermal test results. The examinations were carried out on 52 pruritic cats. In all the cats physical and dermatological examinations as well as specific dermatological tests (hair plucks, skin scrapings, cytology, and culture) were performed. Atopy was suspected in 18 cats and in all of these animals; the intradermal tests were carried out to verify the causative allergen. In most cats, the clinical symptoms were observed all year-round. In most cases, the first clinical signs developed over the age of six months. A predominant feature in all the affected cats was pruritus responsive to corticosteroids. The most common positive immediate reaction in skin tests was the response to *Acarus siro* (43.75%). Positive delayed-type reactions were reported in 50% of the cats and the most common reaction was response to *Acarus siro*, too (18.75%).

Key words: cats, atopy, skin tests.

Atopic dermatitis is a pruritic skin condition associated with the development of hypersensitivity to environmental allergens (13). The disease was first diagnosed in cats in 1982 (13). It is believed that among the allergic conditions reported in this species, it takes second place in terms of the frequency of occurrence (13). It was only recently that the genetic predisposition to this disease was confirmed in the cat (6). In contrast with dogs, there is a lack of diagnostic criteria that allow a diagnosis based on the clinical features to be established. It is assumed that the disease most often affects cats aged 6 months to 3 years (2). The prominent feature is a severe pruritus, but miliary dermatitis and eosinophilic granuloma syndrome may also develop in some cats (2, 5, 7, 13). The typical locations of the lesions include head and neck regions (13). In addition to dermatological signs, allergic bronchitis, bilateral conjunctivitis and blepharitis, and rhinitis occasionally develop (2, 13). Intradermal tests or serological tests for specific antibodies are used in order to confirm the diagnosis of an allergic condition (1-4).

The lack of precise diagnostics criteria makes diagnosis very difficult. The diagnosis may be established when all other causes of pruritus are ruled out (*Cheyletiella* sp. infestation, ear mites (*Otodectes* sp.), scabies, dermatophytosis, psychogenic dermatitis, allergic flea dermatitis, and food allergy).

The aim of the study was to determine the diagnostic approach to atopy in cats based on clinical features and to identify the factors responsible for the development of allergy on the basis of intradermal tests results.

Material and Methods

The examination was carried out on 52 pruritic cats that were presented to the Dermatological Referral Service between 2005 and 2007. The age of the cats ranged between 1 and 6 years, and the group included 14 females and 4 neutered males. The following breeds were represented: Main coon (1), Siamese (1), Persian (2), and European shorthair (14). Physical and dermatological examinations as well as specific dermatological tests (hair plucks, skin scrapings, cytology, and culture) were carried out in all the patients. If the tests did not provide adequate information for a diagnosis to be made, limited allergen diet trial was initiated. All the cats received also anti-flea treatment in order to rule out allergic flea dermatitis. Following the exclusion of other pruritic conditions, atopy was suspected in 18 cats. The intradermal tests were performed to verify the causative allergen; the tests were carried out after the cats were found to be free from any concurrent skin conditions.

Corticosteroids and cyclosporine were discontinued 4 weeks, antibiotics 2 weeks, and antihistaminic drugs and polyunsaturated fatty acids 10 days before the tests were undertaken. The cats were first sedated with xylazine at 0.5 mg/kg b.w. Hair coat was clipped at the lateral thoracic region. Owing to the lack of feline allergen kits, 12 aqueous allergen solutions for dogs (Artuvetrin) were used. Literature data indicate that commercially available canine kits may be used for intradermal testing in cats (9, 10). The kit included the following allergen extracts: *Ctenocephalides felis, Dermatophagoides farinae, Dermatophagoides*...
pteronyssinus, Lepidoglyphus destructor, Tyrophagus putrescentie, Acarus siro, grasses, weeds, coat hair (2 allergens), and trees (2 allergens).

Each time, positive (histamine solution) and negative controls were injected simultaneously with the allergen extracts. The injected volume of each extract and both controls was 0.05 ml. The results were read after 10 – 20 min and 48 h. Positive immediate-type reaction was assumed as erythaema or wheal at the injection site. In the case of delayed-type response, papule and/or erythaema at the injection site were regarded as a positive reaction.

Results

In most cats, the clinical symptoms were observed all year-round, and only in two patients, the symptoms were of seasonal nature. In five cats, it was the first clinical episode and hence it was impossible to determine the seasonality. The first clinical signs developed in most cases over the age of six months (ranging from 6 months to 3 years). In one cat, the symptoms occurred at the age of six years. Pruritus responsive to corticosteroids was the predominant feature in all the affected cats. It was the exclusive symptom in 15 animals (83.3%). The signs attributable to pruritus resulting from many traumatic lesions (alopecia, erythaema, excoriations, and crusts) were localised on the head and neck of all affected cats, and particularly near the auricles (nine animals – 50%). Apart from the head, pruritus was also localised on the abdomen (three cats – 16.67%), caudal surface of the tight (three cats – 16.67%), and in the interdigital spaces (five animals – 27.77%). In two cats (11.1%) eosinophilic granuloma syndrome was diagnosed (as linear granuloma), whereas in one animal miliary dermatitis developed. Erythaemato-ceruminous otitis externa was reported in three animals (16.67%). Following the intradermal tests, two cats did not show any positive response to any of the allergens injected, and these individuals were excluded from the study. Among the cats with the positive reactions in the tests, the majority of immediate-type responses (reading after 15–20 min) were to dust mite allergens, and in 81.25% of the cats, the allergy to at least one dust mite allergen was identified. The most common positive reaction was the response to Acarus siro; 43.75% cats were allergic to this dust mite allergen. Allergy to Dermatophagoides farine was the second most common reaction; 37.5% animals showed immediate-type response to this mite. Positive delayed-type reactions were reported in 50% of the cats (eight patients), and the most common were to dust mite allergens. Seven cats (43.75%) showed a delayed-type response to at least one of the tested mites. Similarly, to the immediate type, Acarus siro (18.75%) evoked the positive reactions most commonly. The positive response to Ctenocephalides felis was also frequently found out. Five cats (31.25%) showed positive reactions to the allergens of feline flea species; among them, two (12.5%) were immediate, and four (25%) were delayed (one animal showed both types). In most cats, the reactions were polyvalent (allergy to multiple allergens), and monovalent positive reactions were reported only in 37.5% of the cats.

Fig. 1. Typical immediate-type reactions in intradermal tests - arrows, boiled arrow positive control.
Fig. 2. Percentage of immediate reaction in intradermal tests to particular allergens (allergens listed in Table 1).

Fig. 3. Percentage of delayed-type reaction in intradermal test to particular allergens (allergens listed in Table 1).

**Table 1**

<table>
<thead>
<tr>
<th>Allergens used in intradermal tests</th>
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<tbody>
<tr>
<td>1. Grass pollen mixture (Bermuda grass, Orchard grass, Sweet vernal grass, Timothy, and Velvet grass)</td>
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<tr>
<td>2. Tree pollen mixture I (Birch, Alder, Hazel)</td>
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<tr>
<td>3. Tree pollen mixture II (Oak, Beech, Elm)</td>
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<tr>
<td>4. Weed pollen mixture (Common mugwort, Stinging nettle, Dandelion and English plantain)</td>
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<td>5. <em>Tyrophagus putrescentiae</em></td>
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<td>6. <em>Dermatophagoides farinae</em></td>
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<td>7. <em>Leptidoglyphus destructor</em></td>
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<tr>
<td>8. <em>Dermatophagoides pteronyssinus</em></td>
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<td>9. <em>Acarus siro</em></td>
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<tr>
<td>10. Dog epithelium</td>
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<td>11. Cat epithelium</td>
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<td>12. Flea</td>
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Discussion

There are difficulties to compare our results with those obtained by other authors, because of lack of such research in Poland. In other countries, few authors use skin tests to diagnose allergies (atopy and small-airway diseases) in cats. Moriello et al. (8) used skin test in cats with small-airway diseases (8). In these cats, they noticed that positive reactions to allergens of house dust mites (Dermatophagoides farinae, Dermatophagoides pteronyssinus) are more common. They also noticed more positive skin reactions to grass allergens (50%) and trees allergens (40%) than we did. The studies of other authors have indicated that, similarly to our observations, the most common cause of atopic reactions in cats are dust mites (Dermatophagoides farinae, Dermatophagoides pteronyssinus, Acarus siro, Tyrophagus putresciensiae) (11, 12).

The factors responsible for the development of allergy are similar to those previously reported by the authors in dogs (14), in which the highest percentage of positive reactions in intradermal tests was to the allergens of dust mites. The authors found monovalent reactions to occur in cats more frequently than in dogs. The studies have also shown that atopy often occurs concurrently with hypersensitivity to feline flea allergens (allergic flea dermatitis). The absence of positive response in some of the examined cats may be related to allergy to allergens different from those used in the tests.

References