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UDC 619:616.5-002:636.7 **Research article**

Diagnostic Approaches and Comparative Effectiveness of Modern Methods for Treating Atopic Dermatitis in Dogs

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Abstract

Background and Aim. Atopic dermatitis (AD) is a common allergic skin disorder in dogs and is often difficult to diagnose due to overlapping clinical signs with other dermatological conditions. This study aimed to assess the prevalence, clinical and epidemiological features, diagnostic approaches, and comparative effectiveness of modern anti-pruritic therapies in a clinical setting.

Materials and Methods. The study was conducted between 2022 and 2024 at the "VetAlliance" veterinary clinic in Kostanay, Kazakhstan. Out of 482 dogs presenting with dermatological complaints, 53 dogs with chronic pruritus (>6 weeks), meeting ≥5 Favrot criteria, and free from parasitic, infectious, or endocrine diseases were included. Diagnostic evaluation included history-taking via standardized questionnaires, clinical examination, CADLI and PVAS scoring, Favrot criteria assessment, cytology, and serological testing for allergen-specific IgE in 18 dogs. Dogs were allocated to three therapeutic groups: monoclonal antibodies (Lokivetmab/Cytopoint), JAK inhibitor (Oclacitinib/Apoquel), and prednisolone. Clinical signs were assessed on days 0, 14, 28, and 56. Statistical analysis included descriptive statistics, $\chi 2$ tests, ANOVA or Kruskal–Wallis tests, and odds ratios, with significance set at $p < 0.05$.

Results. AD was confirmed in 53 of 482 dogs (~11%), predominantly in females (58.5%) aged 3-4 years. French Bulldogs and West Highland White Terriers were the most frequently affected purebred dogs. Secondary infections with *Staphylococcus* spp. and *Malassezia* spp. were detected in 43.4% and 15.1% of cases respectively. All three treatments significantly reduced pruritus and skin lesions. Lokivetmab and prednisolone provided more rapid initial improvement, while comparable clinical efficacy among all treatments was observed by day 30.

Conclusion. Canine AD is a multifactorial allergic disease requiring a comprehensive diagnostic approach, including history, clinical evaluation, PVAS/CADLI scoring, Favrot criteria assessment, and cytological analysis. Treatment should be individualized according to disease severity and patient characteristics, utilizing modern anti–pruritic agents–monoclonal antibodies, JAK inhibitors, or prednisolone–combined with regular monitoring, risk factor management, and owner education to ensure long-term disease control.

Keywords: atopic dermatitis; dogs; itching; diagnosis; treatment.

Introduction

In clinical veterinary practice, dermatological diseases in dogs are common and often challenging to diagnose due to the similarity of clinical signs across different conditions. Accurate diagnosis requires not only an understanding of disease pathogenesis but also the appropriate selection of diagnostic methods for effective differentiation. One such disease, whose clinical signs may be similar to other skin diseases, is atopic dermatitis in dogs. Atopic dermatitis is a common skin disease that is diagnosed in an average of 10-15% of dogs [1, 2]. It is a genetically predisposed inflammatory skin disease accompanied by itching [3]. The pathogenesis and clinical signs of the disease are associated with a type I hypersensitivity reaction to environmental allergens and skin barrier dysfunction [4, 5].

The diagnosis of atopic dermatitis is complicated by the fact that other skin diseases in dogs can have symptoms similar to AD. Therefore, if atopic dermatitis is suspected, it is necessary to carefully collect the patient's medical history, conduct a clinical examination, and differentiate it from other skin diseases with similar manifestations [6]. Allergy tests (intradermal and serological tests) are often performed to determine which allergens should be avoided and which should be included in allergen-specific immunotherapy [1, 7, 8].

To reduce itching and clinical manifestations, each patient is individually selected for supportive therapy, which may include glucocorticoids (systemic or topical), cyclosporine, lokivetmab, and oclacitinib. Antihistamines, supplements with essential fatty acids (systemic or topical), therapeutic baths, and other methods are also used [9].

There is still debate about which diagnostic method is the most accurate and which treatment regimen to choose so that the animal can lead a full life. Therefore, the topic of atopic dermatitis remains relevant worldwide, and further scientific research is needed to successfully control the skin condition of patients suffering from atopic dermatitis.

Research objective: to comprehensively assess the prevalence, clinical and epidemiological characteristics, and diagnostic approaches to identifying atopic dermatitis in dogs in a veterinary clinic, as well as to evaluate the effectiveness of various anti-pruritic treatment regimens used in clinical practice.

Materials and Methods

Ethical approval

This study was conducted in strict accordance with generally accepted standards and rules for the treatment of experimental and clinical animals, as reflected in current international recommendations on bioethics and humane treatment. All procedures involving dogs were performed only after obtaining permission from the local animal ethics committee (similar to IACUC), which reviewed the study protocol and confirmed its compliance with requirements for minimizing stress and discomfort in animals. Biological material was collected by veterinary specialists and only with the prior informed consent of the animal owners. The owners were provided with full information about the purposes, methods and potential risks of the procedure, after which they voluntarily confirmed their pets' participation. All actions were carried out in accordance with humane treatment standards and measures aimed at ensuring the safety and well-being of the dogs. The information obtained during the study was used exclusively for research purposes. The confidentiality of the animals and their owners was fully preserved: personal information was not disclosed or used outside the scope of this project.

The study was carried out from 2022 to 2024 at the “VetAlliance” veterinary clinic (Kostanay). During this period, 482 dogs with various dermatological problems were admitted to the clinic, of which n=53 animals with clinical symptoms of atopic dermatitis were selected:

- chronic itching lasting more than 6 weeks;
- compliance with ≥5 Favrot criteria;
- primary itching in the absence of parasitic diseases (scotch test, cytology);
- exclusion of infectious and endocrine diseases mimicking AD;
- absence of systemic GCS <30 days and oclacitinib/cytopoint <60 days prior to the study.

To clarify the anamnestic data, each owner filled out a standardized questionnaire containing information about: breed, age, and sex; seasonality of exacerbations; duration of itching; type of feeding; housing conditions; preventive treatment for parasites; last bathing; concomitant diseases; previously used antipruritic therapy.

Based on the questionnaire data, the animals were divided into groups according to the following criteria:

- Breed: French Bulldog, West Highland White Terrier, Yorkshire Terrier, American Akita, Bichon Frise, other breeds, mixed breeds.
- Age: 1–2, 2–3, 3–4, 4–6, 6–8, 8–10 years.
- Sex: males and females.
- Living conditions: indoors/outdoors or mainly outdoors.
- Type of food: premium commercial food, economy-class food, homemade food, mixed type. These data were used to analyze risk factors.

The clinical examination of dogs was performed by visual inspection under standard lighting conditions, which included a general examination of the animal from the front, rear, and side, and a detailed examination on the table: muzzle, periorbital area, ears, neck, chest and pelvic limbs, back, abdomen, groin and armpit areas, and tail.

The following methods were used to assess the severity of lesions: CADLI (Canine Atopic Dermatitis Lesion Index) [10]; PVAS scale (subjective assessment of itching severity by the owner) [11, 12]; Favrot criteria (to confirm the diagnosis of AD) [13]. The following were recorded: erythema, excoriations, erosions, alopecia, lichenification, hyperpigmentation, prevalence, and localization.

Cytology was performed on all dogs to detect secondary bacterial and fungal infections. Samples were taken from the skin by applying a microscope slide to the affected areas and from the ear canal using a sterile swab. The samples obtained were stained with Diff-Quik and then examined under a microscope at 100×magnification (immersion system). The following were identified: cocci, rods, neutrophils, degenerative forms, yeast-like fungi (Malassezia).

For comparison of therapeutic regimens, dogs were divided into three therapeutic groups: Group 1 received Lokivetmab (Cytopoint) - monoclonal antibodies; Group 2 received Oclacitinib (Apoquel); Group 3 received Prednisolone (Prednicortone).

The effectiveness of the drugs was assessed at control points: day 0, day 14, day 28, and day 56.

The following were measured: PVAS dynamics; CADLI dynamics; rate of clinical improvement; presence/absence of side effects.

Statistical data processing was performed using the following methods: descriptive statistics (M±SD, %, n); χ^2 – comparison of categorical characteristics (breed, housing conditions); ANOVA / Kruskal–Wallis – comparison of CADLI and PVAS indicators between therapy groups; – OR (Odds Ratio) - assessment of risk factors for AD development; significance threshold $p < 0.05$. 2.9.

Results and Discussion

Between 2022 and 2024, the owners of 482 dogs sought treatment for skin problems at the VetAlliance veterinary clinic (Kostanay). After comprehensive diagnosis, atopic dermatitis was confirmed in 53 animals (Figure 1). The remaining cases were distributed as follows: parasitic diseases – 116 dogs, food allergies – 154, skin diseases of other origins – 159.

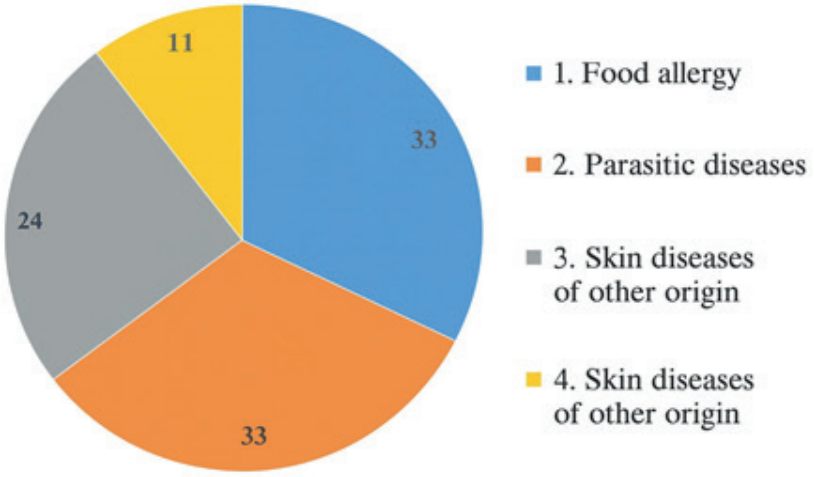

Figure 1 – Distribution of causes of dermatoses in dogs

Sex analysis showed that among animals with atopic dermatitis, females predominated – 31 (58.5%), males – 22 (41.5%) (Figure 2).

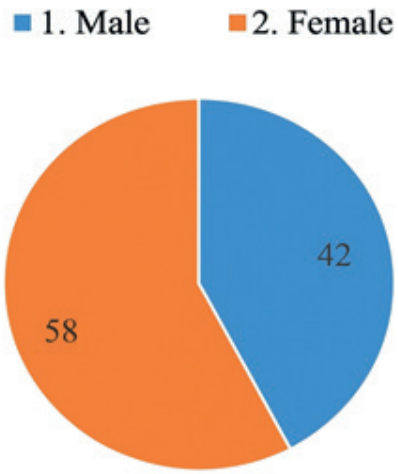

Figure 2 – Incidence of atopic dermatitis in dogs by gender

In the study group of 53 dogs, there were 51 purebreds and 2 mixed breeds. Among purebred animals, the largest numbers were French Bulldogs (17%), West Highland White Terriers (15.1%), Yorkshire Terriers and American Akitas (7.5% each), and Bichon Frises (5.7%). Other breeds accounted for 43.4% of the animals studied (1-2 dogs per breed) (Figure 3). Statistical analysis did not reveal a significant association between breed and AD incidence ($p>0.05$).

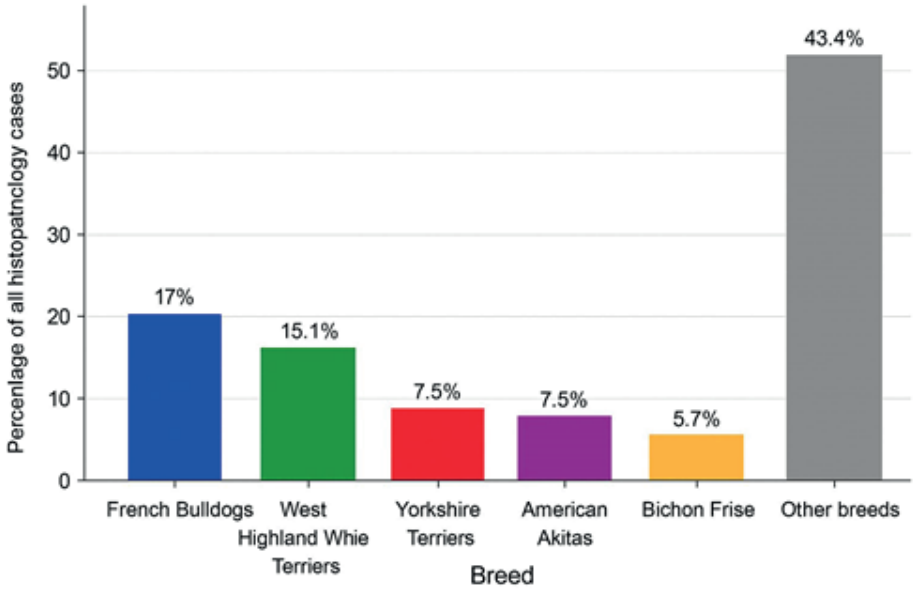

Figure 3 – Incidence of atopic dermatitis in dogs of different breeds

The age of the dogs studied ranged from 1 to 10 years. The dogs were divided into six age groups. The highest number of AD cases was recorded in dogs aged 3-4 years (n=16), 2-3 years (n=13), and 4-6 years (n=8). Animals aged 1-2 years (n=6), 6-8 years (n=5), and 8-10 years (n=5) were less frequently affected (Figure 4).

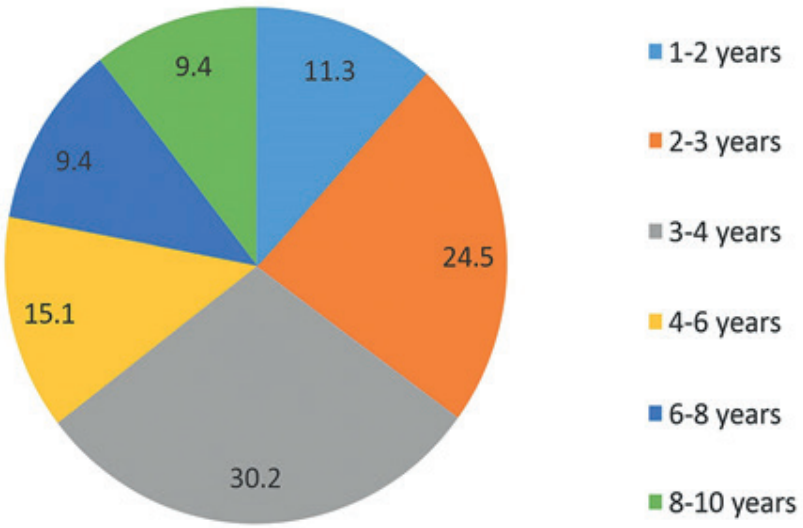

Figure 4 – Incidence of atopic dermatitis in dogs by age

An analysis of breed and age revealed the following:

- All mixed breeds (n=2) were between 1 and 2 years old (100%).
- French Bulldogs were more frequently affected at 4-6 years old (33.3%), less often at 3-4 years old (22.2%) and 8-10 years old (12.5%).
- West Highland White Terriers: 2-3 years old (50%), 3-4 years old (12.5%).
- Yorkshire Terriers : 3-4 years old (50%).
- American Akitas : 4-6 years old (50%), 8-10 years (25%).
- Bichon Frises: 2-3 years (66.7%).
- Dogs of other breeds: mainly 3-4 years (43.5%) (Figure 5).

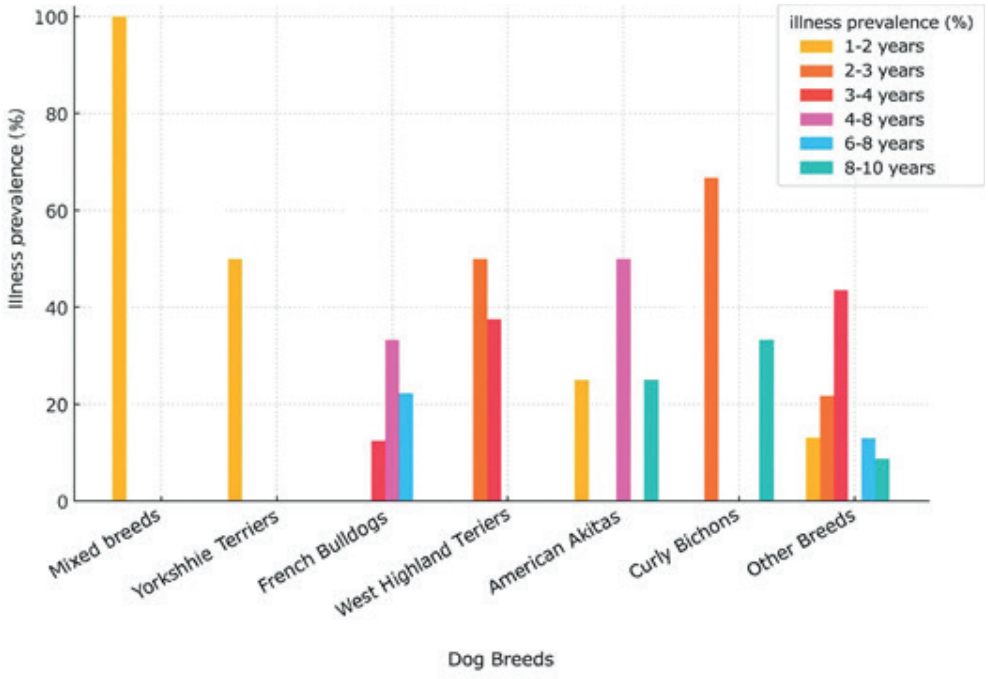

Figure 5 – Distribution of atopic dermatitis incidence by breed and age of dogs

Indoor and outdoor dogs were most frequently affected by atopic dermatitis (n=46). A small proportion of dogs (n=7) with atopic dermatitis were kept outdoors only (Figure 6).

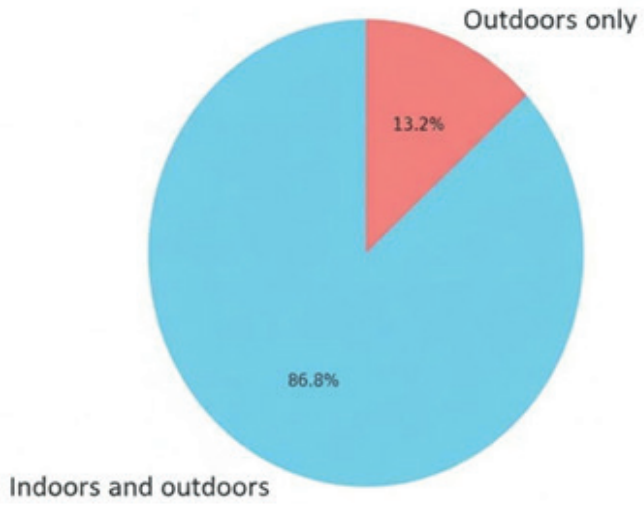

Figure 6 – Conditions for keeping dogs suffering from atopic dermatitis

The coats of French Bulldogs (100%), West Highland White Terriers (100%), Yorkshire Terriers (100%), and Bichon Frisés (100%) were kept both indoors and outdoors (Figure 7). Half of the American Akita (50%) and mixed breed (50%) dogs were kept outdoors only. Most other dog breeds (82.6%) were kept both indoors and outdoors, and only a small proportion (17.4%) were kept exclusively outdoors.

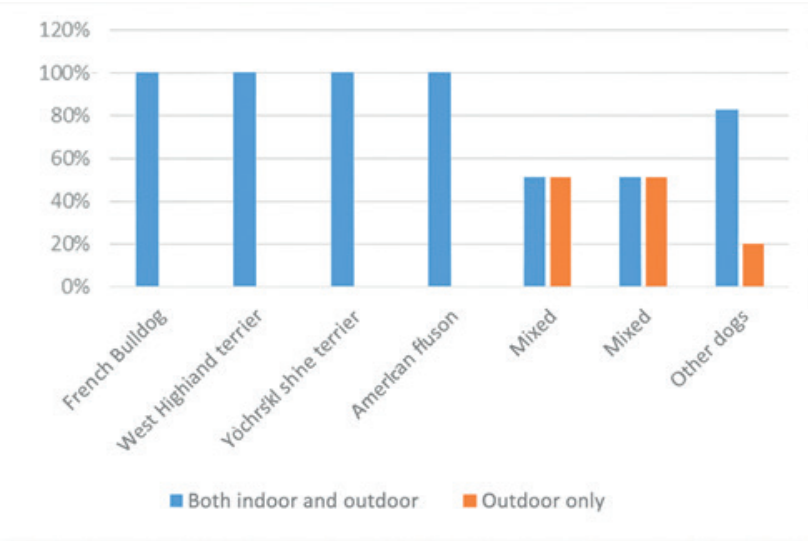

Figure 7 – Conditions for keeping dogs of different breeds

The results of the owners' responses to the questionnaire showed that most dogs (n=22) are fed a mixed diet (dry commercial food, canned food, treats, human food, etc.) (Figure 8). The smallest number of dogs (n=7) were fed homemade food (cooked or raw chicken, beef, pork, etc.). Fifteen dogs were fed commercial (premium) food, and nine dogs were fed commercial (economy class) food.

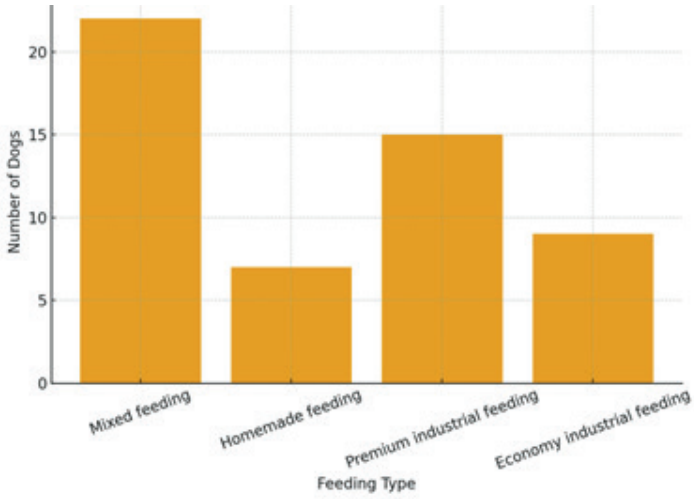

Figure 8 – Types of feeding for dogs suffering from atopic dermatitis

Thus, 100% of Yorkshire Terriers and their crossbreeds were fed a mixed diet. Half of the American Akita dogs were fed commercial (premium) and homemade food. Most French Bulldogs (44.4%) were fed a mixed diet, 33.3% were fed commercial (premium) food, and 22.2% were fed commercial (economy class) food. Most (50%) West Highland White Terriers were fed commercial (economy) food, while 12.5% were fed commercial (premium) food and 12.5% were fed homemade food. 33.3% of Bichon Frises were fed commercial (premium) food, commercial (economy class) food, and mixed food. Most other breeds of dogs (39.1%) were fed mixed food, and the smallest proportion (8.7%) were fed industrial (economy class) food. 34.8% of dogs of other breeds were fed industrial (premium) food, and 17.4% were fed homemade food.

When assessing the seasonality of clinical signs, it was found that in most dogs (n=34), clinical signs worsened in the spring and summer (Figure 9). The smallest number of dogs (n=6) had acute clinical signs throughout all seasons of the year, and the autumn-winter period was characterised by exacerbation in 13 of the dogs studied.

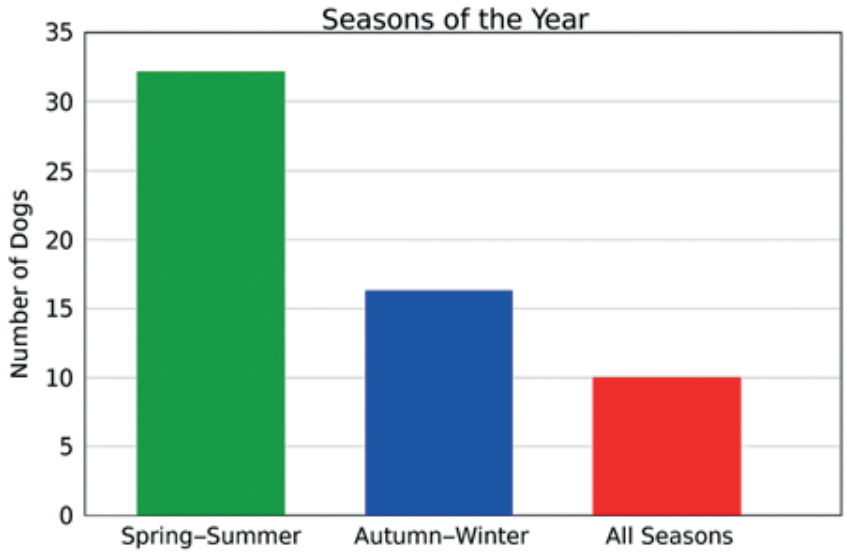

Figure 9 – Periods of exacerbation of clinical signs in dogs suffering from atopic dermatitis

Medical history collection, assessment of clinical sign severity (using the CADLI scale), application of Favrot criteria, and cytological examination of the skin or ears were performed for all dogs in the study (n=53). Serological testing for specific IgE to allergens was performed in 18 dogs in the study (Figure 10).

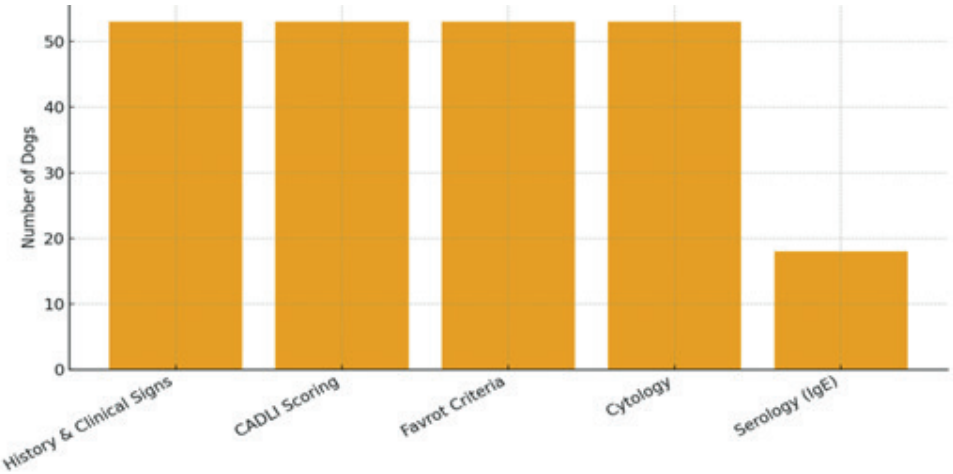

Figure 10 – Methods for diagnosing atopic dermatitis

As an adjunct to the diagnosis of atopic dermatitis in dogs, the Favrot criteria were applied to all subjects. For most subjects (n=29), 5 signs coincided. 6 signs coincided in 19 dogs, and 7 signs coincided in 5 dogs (Figure 11).

Cytological examination of the ears and skin was performed on all dogs examined (n=53) to determine the presence of secondary infection. The results of the study showed that 43.4% of dogs suffered from a secondary infection with *Staphylococcus* spp., 15.1% of dogs suffered from an infection with *Malassezia* spp., and 41.5% of the dogs examined had no pathogens detected in the cytological samples (Figure 11).

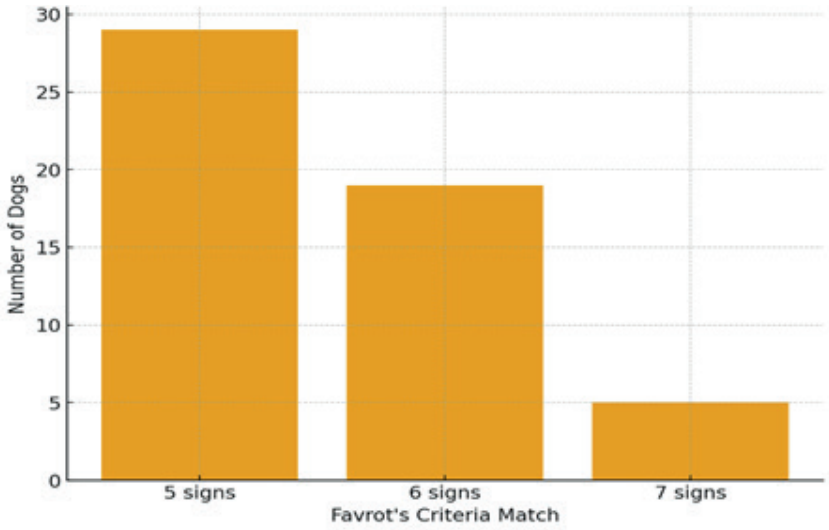

Figure 11 – Distribution of dogs by number of Favrot criteria met

When assessing the localization of clinical signs on the CADLI scale, it was found that the largest number of dogs examined had lesions on the front limbs (96.2%) and ears (71.7%) (Figure 12, 13, 14). The least frequent lesions were located in the groin (20.8%) and head (24.5%). More than half of the dogs studied (56.6%) had lesions on their hind limbs. Lesions were also found in dogs (n=53) in the ventral chest area (39.6%), ventral abdomen (35.8%) and armpits (32.1%).

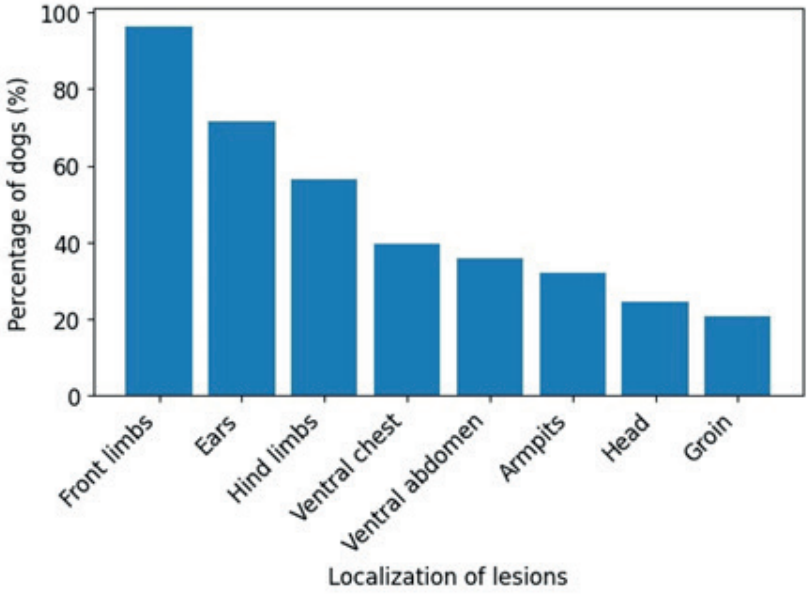

Figure 12 – CADLI scale assessment of clinical signs

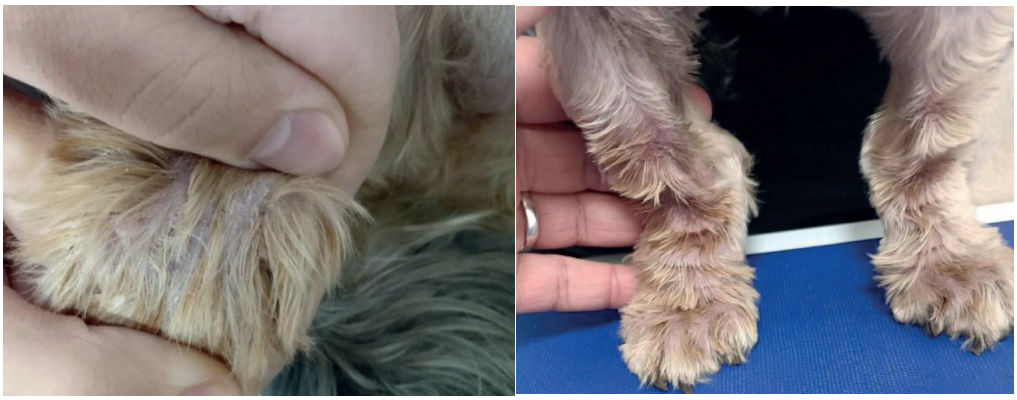

Figure 13 – Left: photograph of the front limbs taken during the initial visit; right: photograph taken during a follow-up visit 30 days later. The lesions are located on the front limbs

Figure 14 – Left: appearance of the ear during the initial visit; right:
during the follow-up visit 30 days later.
Lesions are localised in the ears

The CADLI scale was used to assess the severity of clinical signs. After analysing the data (Table 1), it was found that the average total score of the dogs examined during the first visit was 17.38±8.25 points. The minimum score was 6 and the maximum was 36.

When analysing the data between individual groups, the following was revealed: In group I, the average score was 21.65±9.66. The minimum value was 6, and the maximum was 36. In group II, the average score was 18.17±7.27. The minimum value was 7, and the maximum was 32. In group III, the average score was 12.56±4.89. The minimum value was 6, and the maximum was 21. Statistical analysis showed a significant correlation between the average scores in groups I, II, and III ($p<0.001$).

Table 1 – Severity of clinical signs at the initial visit according to the CADLI scale (in points)

Group	Average score (M±SD)	Minimum score	Maximum score
All dogs	17.38±8.25	6	36
I	21.65±9.66	6	36
II	18.17±7.27	7	32
III	12.56±4.89	6	21

After assessing the effectiveness of the therapies used at a follow-up examination 10 days later, it was found that clinical signs decreased by 55.2% in group I, 44.1% in group II, and 58.5% in group III (Figure 15). Statistical analysis showed that clinical signs decreased significantly between groups I and II, as well as between groups II and III ($p < 0.05$).

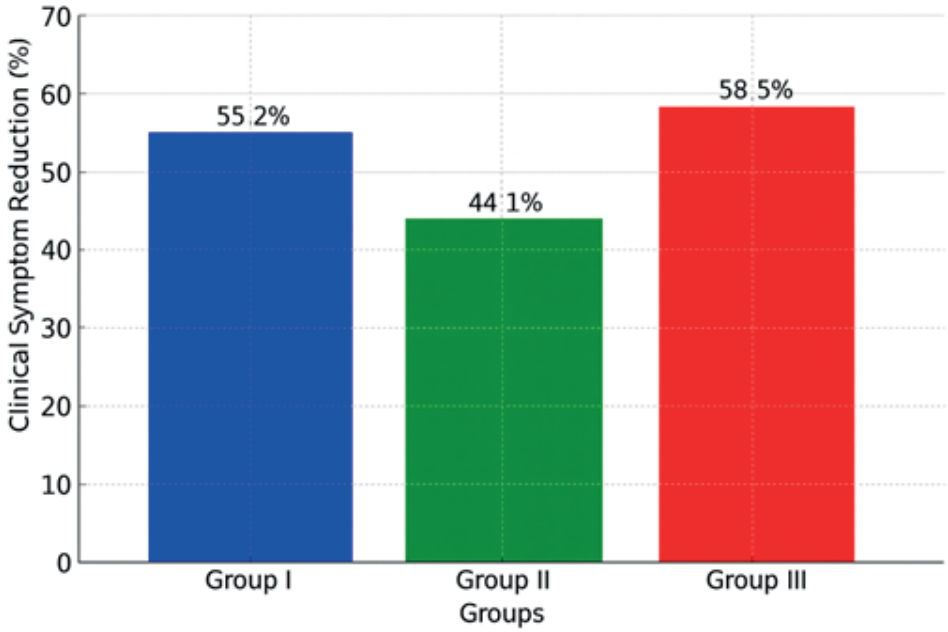

Figure 15 – Change in clinical signs during a follow-up visit 10 days later

Twenty days after the initial visit, it was found that clinical signs decreased by 73.8% in group I, by 62.7% in group II, and by 86.2% in group III (Figure 16). Statistical analysis showed that clinical signs decreased significantly between groups II and III ($p<0.05$).

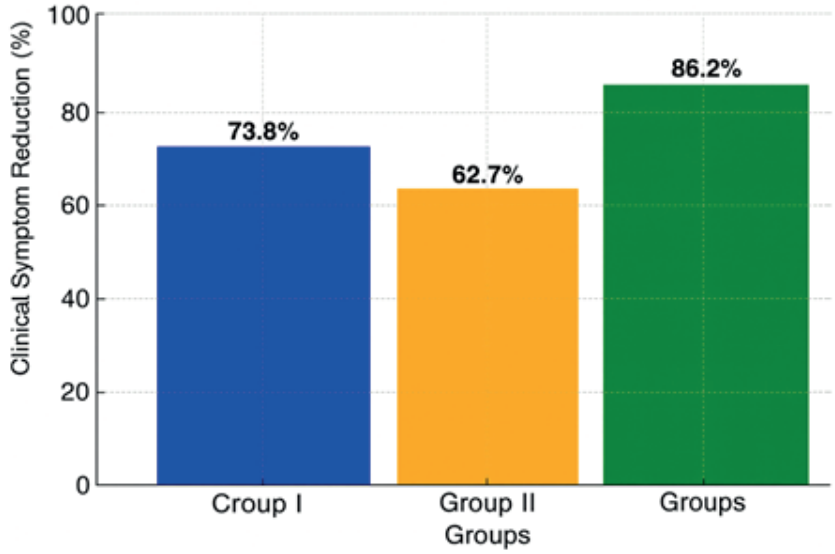

Figure 16 – Change in clinical signs at the follow-up visit after 20 days

At the follow-up examination after 30 days, assessing the reduction in clinical signs, it was found that the clinical signs in group I decreased by 82.2%, in group II by 71.4%, and in group III by 95.1% (Figure 17). Statistical analysis showed that clinical signs decreased significantly between groups I and III, as well as between groups II and III ($p<0.05$).

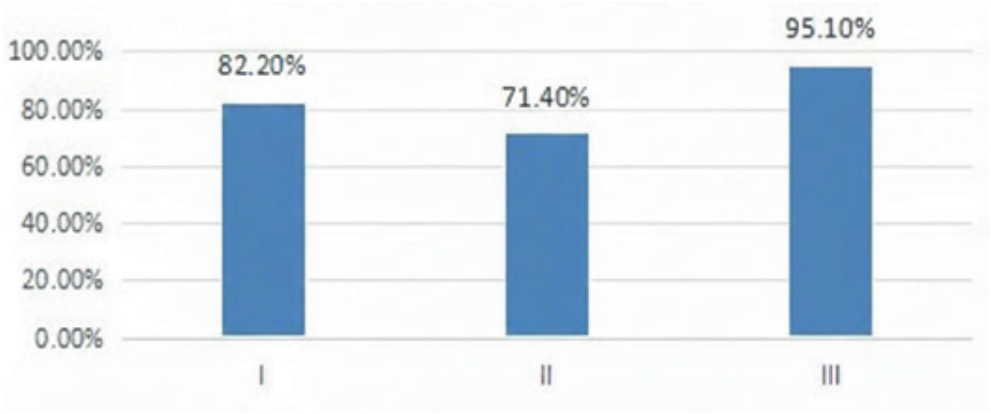

Figure 17 – Change in clinical signs at the 30-day follow-up visit

Thus, atopic dermatitis was more commonly detected in females, mainly aged 3-4 years. Among purebred dogs, French Bulldogs and West Highland White Terriers were at the highest risk, while mixed-breed dogs developed the disease at an earlier age (1-2 years).

The results of the present study confirm that atopic dermatitis (AD) remains one of the most frequently diagnosed allergic dermatoses in dogs, accounting for a substantial proportion of dermatological cases among clinical veterinary patients. In our cohort, AD was confirmed in 53 out of 482 dogs (≈11%), which corresponds with published data on the prevalence of Canine Atopic Dermatitis (CAD), estimated at up to 10% in the general dog population and associated with increasing risk factors such as environmental pollution, indoor housing, and the genetic predisposition of various breeds [31.6% according to international AD market data] [14].

Consistent with the literature, clinical signs of CAD most commonly manifest in early adulthood: the majority of patients show pruritus and skin lesions by 1-3 years of age, although disease onset can occur up to 7 years or later depending on individual characteristics and breed susceptibility [14, 15]. In our study, the highest number of cases was observed in the age groups 3-4 years (30%), 2-3 years (24.5%), and 4-6 years (15.1%), which aligns with literature reports of peak clinical manifestation of CAD in young to middle-aged dogs [15].

Gender differences in CAD prevalence in dogs are inconsistently described in the literature, and most authors do not find a consistent association between sex and CAD risk [16]. In our sample, females predominated (58.5%); however, this does not contradict existing studies, considering population variability and the influence of other risk factors such as breed predisposition and housing conditions.

Among the risk factors included in our survey, most affected dogs were kept both indoors and outdoors. Such combined housing conditions may increase exposure to a broad spectrum of airborne allergens (pollen, dust mites, fungal spores), which is recognized in the literature as a factor exacerbating the clinical manifestations of CAD [14].

Breed-specific risk factors are also supported by several studies. For instance, recent publications frequently report French Bulldogs among breeds with high susceptibility to allergic dermatitis, along with other companion-type breeds [16, 17]. In our cohort, the most common purebred cases were French Bulldogs and West Highland White Terriers, which corresponds with previous data on breed-related susceptibility.

Cytological examination confirmed a high prevalence of secondary infections with *Staphylococcus* spp. and *Malassezia* spp., which is consistent with known pathogenic mechanisms of CAD, where skin barrier dysfunction creates favorable conditions for bacterial and fungal overgrowth [18, 19]. Recent publications emphasize the importance of identifying and managing secondary infections in the comprehensive treatment of atopic dermatitis, as these infections independently exacerbate pruritus and inflammation and may reduce the effectiveness of basic therapy [19].

Regarding therapeutic approaches, our results show that all three compared regimens Lokivetmab (Cytopoint), Oclacitinib (Apoquel), and Prednisolone lead to significant reduction in clinical signs of CAD according to PVAS and CADLI scales. This is consistent with current clinical data: JAK

inhibitors, such as oclacitinib, rapidly reduce pruritus and can be comparable in short-term efficacy to glucocorticoids [17]. Monoclonal antibodies, such as lokivetmab, provide effective and sustained reduction of IL-31–mediated pruritus with a convenient administration schedule every 4-8 weeks, as confirmed by international therapeutic reviews and contemporary veterinary market analyses [15].

It is important to note that prednisolone remains an effective option for controlling acute symptoms; however, prolonged use requires caution due to the risk of side effects and potential relapses after discontinuation, as emphasized in domestic veterinary guidelines [17].

Thus, the obtained results support the current understanding of CAD as a multifactorial disease requiring a comprehensive approach to diagnosis and therapy. Comparing our data with recent literature highlights the importance of considering age and breed factors and confirms the clinical efficacy of modern anti-pruritic and anti-inflammatory drugs in veterinary dermatology practice.

Conclusion

Canine atopic dermatitis is a prevalent allergic skin disease, most frequently affecting female dogs aged 3-4 years and breeds such as French Bulldogs and West Highland White Terriers. Accurate diagnosis requires a comprehensive approach combining history taking, clinical examination, PVAS and CADLI scoring, Favrot criteria assessment, and cytological evaluation to identify secondary infections. Therapeutic strategies should be individualized according to disease severity and patient characteristics, employing modern anti-pruritic agents such as monoclonal antibodies (Cytopoint), JAK inhibitors (Apoquel), or prednisolone, along with regular clinical monitoring, risk factor management, and owner education to achieve long-term disease control.

Author Contributions

ZA: Writing – original draft, Investigation, Software, Data curation, Formal Analysis, Project administration, Visualization. AZh: Writing – original draft, Writing – review & editing, Investigation, Methodology, Formal Analysis, Visualization. RR: Writing – review & editing, Methodology; Writing – original draft, review & editing, Conceptualization, Data curation, Supervision. KS: Writing – original draft, Data curation, Formal Analysis. MKh: Writing – review & editing, Methodology. DZh: Writing – original draft, Investigation, Visualization.

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