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Research article

THE QUALITY OF LIFE OF ALLERGIC CATS, TREATED WITH ALLERGEN-SPECIFIC IMMUNOTHERAPY – A RETROSPECTIVE STUDY

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Feline atopic skin syndrome (FASS) describes allergic skin diseases in cats associated with sensitivity to environmental allergens. Allergen-specific immunotherapy (ASIT) aims to reduce or eliminate symptoms associated with subsequent exposure to the causative allergen. The primary outcome of this study was to determine if the quality of life (QoL) of cats and owners improved as a result of ASIT. The secondary outcome was to determine whether the QoL improved in cats treated with ASIT compared with cats treated symptomatically. Eight cats were included in the ASIT group (AG) and 6 cats in the control group (CG). Validated quality of life questionnaires were retrospectively completed by cat owners for the period before and after treatment. The QoL of cats improved significantly with ASIT. Cats were significantly less lazy, nervous, aggressive, restrained, preened less while sleeping and hid less, were less disturbed by consultations, were more playful and interactive with their environment, and had better appetites than before treatment. Owners felt significantly less physically exhausted and less emotionally distressed compared to before ASIT treatment and their expenses were significantly lower. On the contrary various symptomatic treatments did not significantly improve the quality of life of the cats or their owners in any of the terms. No serious side effects were observed with ASIT. The quality of life of animals suffering from chronic diseases is important as it determines the decisions of owners and veterinarians on the modalities of lifelong treatment. Validated questionnaires are still rarely used in veterinary practice and research.

Keywords: atopic, cats, immunotherapy, skin

INTRODUCTION

Skin diseases are common in cats. Mild dermatoses cause little or no disturbance, while in severe cases they can be associated with severe itching, pain and discomfort [1]. Administration of medications, dietary changes, physical restrictions due to Elizabethan collars or bandages, visits to veterinary clinics, and the associated consultations can be

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very disruptive for cat patients. Caring for a cat with a chronic skin condition brings serious psychological consequences in addition to the financial impact. These include changing habits, administering medication, and feelings of sadness, guilt, and disgust that can negatively impact the owners' lives [2].

Regardless of the current lack of consensus relating to the definition of QoL, assessment of QoL is an important component of veterinary surgeon and owner decision-making for many conditions [3]. In veterinary medicine, QoL has been defined as "the level of an individual's satisfaction (needs and desires) that are determined by the individual's living conditions, which then determine factors such as health, happiness and longevity" [5]. In the veterinary profession, as animals cannot directly express how they feel, all QoL assessment tools are classified as observer-reported outcome measures [4].

While in dogs atopic dermatitis has a classical clinical appearance of cutaneous hypersensitivity diseases, cats show differences in clinical signs, pathogenesis, and specific treatment recommendations [6]. Cats present cutaneous reaction patterns that can all be caused by flea bites, environmental and food allergens and often other causes as well. Consequently, a new terminology has been introduced recently. The term "feline atopic syndrome" (FAS) is proposed to encompass allergic skin, gastrointestinal, and respiratory conditions, while "feline atopic skin syndrome" (FASS) is proposed to describe allergic skin conditions associated with environmental allergies, and "food allergy" (FA) is proposed to describe allergic reactions to food [7].

Similar to canine atopic dermatitis, FASS is a clinical diagnosis based on the presence of compatible clinical signs and exclusion of other diseases with similar clinical features. Elimination or exclusion of flea allergy dermatitis, ectoparasites, infections, and food allergies is mandatory before the diagnosis FASS can be made [6,7]. Skin manifestations of FASS include miliary dermatitis (MD), self-inflicted alopecia/hypotrichosis (SIAH), head and neck pruritus (HNP), and eosinophilic granuloma complex (EGC). Either alone or in combination and after ruling out other possible causes, these patterns are compatible with FASS diagnosis [8,9]. Allergy testing does only make sense when the owner is willing to treat the cat with allergen-specific immunotherapy (ASIT), so it should not be performed as a routine in every allergy suspicion or confirmed allergic animal. Allergy tests are not diagnostic. Rather, they support a clinical diagnosis of FASS and are used to determine the allergens that may trigger the disease and should be selected for ASIT [9-12].

Treatment of FAS can be by allergen avoidance (which works well for food allergies), symptomatic medications (for acute exacerbations or maintenance, more recently called proactive therapy), and ASIT. Allergen-specific immunotherapy is the administration of gradually increasing amounts of an allergen extract to an allergic patient with the goal of reducing or eliminating clinical signs associated with exposure to the causative allergen [13], which is done by modulating the immune response. Several clinical trials

have shown ASIT to be a safe and effective treatment for dogs with atopic dermatitis, while fewer studies have been conducted in atopic cats [14-21].

The Quality of Life (QoL) questionnaire was recently developed and published by a group of veterinary dermatologists to assess the quality of life of cats with skin diseases and their owners [2]. To the best of the authors' knowledge, this validated questionnaire has rarely been used in research [3]. The aim of the study was to apply the questionnaire retrospectively to assess the quality of life of cats with FASS treated with ASIT in Slovenia compared to cats with FASS, not - treated with ASIT.

The primary outcome of this study was to determine if the QoL of cats and owners improved as the result of ASIT. The secondary outcome was to determine if the QoL of ASIT - treated cats improved compared to cats, not - treated with ASIT.

MATERIAL AND METHODS

Ethical animal research

Ethical approval was not required for this retrospective type of study.

Included animals

Cats with FASS, treated with ASIT in Slovenia throughout the period of 15 years (from 2005 to 2020) were included in this study (ASIT group; AG). The control group consisted of the cats with FASS, treated with various symptomatic drugs but not treated with ASIT (CG). The request for reporting cats with FASS, treated with ASIT, was sent by mail to more than 100 Slovenian small animal practices. Clinics that responded, provided data on the animals and contacts of the owners. Additionally, medical records of the Small Animal Clinic of the Faculty of Veterinary Medicine in Ljubljana were searched and manually reviewed. The owner's consent was given by an invitation to participate by mail. For ethical reasons included cats needed to be alive at the time of the study.

Questionnaires

Validated questionnaires assessing the quality of life of cats with skin disease and their owners [2] were translated into Slovenian and sent by email to the owners of cats with FASS treated either symptomatically or with ASIT. Each owner completed 2 questionnaires. The first one related to the cat's quality of life before treatment and the second to the cat's quality of life for the period of at least 1 year after the start of the treatment. Cats have already finished their treatments at the time of the study. Owners gave written consent to record the data and were assured that no identification would be possible due to complete anonymization.

ASIT treatment

Serum samples of all included cats were tested by ELISA for IgEs against environmental allergens at the same laboratory (Alergovet Laboratories, Valentín Beato

244ta planta, oficina 8B28037, Madrid, Spain). The allergen extract used for ASIT was manufactured by Nextmune (Vijzelweg 11, 8243 PM Lelystad, The Netherlands). The composition was individual for each patient. Participating cats were prescribed the same desensitization protocol (Nextmune official instructions). Briefly, the protocol consisted of s/c injections of allergen mixtures increasing from 0.2 mL to 1.0 mL. Therapy was started with 4 injections every 2 weeks, continued with 2 injections every 3 weeks, and maintained with 1 injection every 4 weeks. Individual adjustments to the dose were possible if the physician determined intolerance. The cats of CG were treated with a variety of anti-pruritic drugs. Antipruritic drugs that were available for cats at the time of the study were topical, oral and injectional glucocorticoids and cyclosporine-A.

Statistical analysis

To determine whether the responses for each question separately were normally distributed in all groups (AG and CG before treatment, AG and CG after treatment), we used the Shapiro-Wilk test with significance level 0.05. With this information, we knew whether data were normally or not normally distributed. Once we knew the characteristics of each question, we compared them individually. In the case of normal distribution of pretreatment and posttreatment responses for each group separately, a paired two-tailed t test with significance level 0.05 was performed. If at least one set of responses for each question had abnormal distribution, the Mann-Whitney U test was used. To compare the CG and AG groups, an unpaired two-tailed t test (if both data were normally distributed) or the two-tailed Mann-Whitney U test (if not normally distributed) with a significance level of 0.05 was performed for each question. The computer program Python was used.

Informed consent

Informed consent has been obtained for client-owned animals included in this study.

RESULTS

Epidemiology of the cats

Of the more than one hundred private practices, two each reported a cat treated with ASIT. The medical records of the Small Animal Clinic of the Faculty of Veterinary Medicine in Ljubljana listed six cats treated with ASIT. These 8 cats constituted the research group. The medical records of the faculty contained 21 cats that were eligible for the control group. These cats were diagnosed at FASS and were positive on serological tests, but the owners had not opted for ASIT even though it was recommended. Unfortunately, most of them were either dead or the owners could not be reached at the time of the study. Finally, 6 cats formed the control group. ASIT - treated group (AG) consisted of 5 female and 3 male cats, 7 were European

domestic cats and 1 was Maine Coon (Table 1). The age of the AG cats at the start of ASIT ranged from 1 to 11 years, with median age of 7 years. Four cats were treated for longer than 9 months (achieving maintenance treatment), two cats were treated for 9 months (termination of initial treatment due to marked improvement), and two cats were treated for less than 9 months (early termination of initial treatment) (Table 1). The control group (CG) consisted of six cats, 4 males and 2 females. There were 4 European domestic cats, 1 Persian cat and 1 Maine Coon. The age of the CG cats at the time of testing ranged from 6 months to 4 years, with a median age of 2 years (Table 2).

Table 1. Epidemiological data of cats in allergen-specific immunotherapy treated group (AG)

Patient No.	Gender	Breed	Age at the beginning of ASIT treatment (years)	Duration of therapy
1	Female	European shorthair	2,5	Less than 9 months
2	Female	European shorthair	8	Less than 9 months
3	Male	European shorthair	1	9 months
4	Female	European shorthair	11	9 months
5	Female	European shorthair	9	More than 9 months
6	Female	European shorthair	7	More than 9 months
7	Male	European shorthair	9	More than 9 months
8	Male	Maine Coon	4	More than 9 months

Table 2. Epidemiological data of cats in the control group (CG) treated symptomatically but not with allergen-specific immunotherapy

Patient No.	Gender	Breed	Age at the beginning of the treatment (in years)
9	Male	Maine Coon	2
10	Female	Persian	4
11	Male	European shorthair	3
12	Male	European shorthair	2
13	Male	European shorthair	2
14	Female	European shorthair	0,5

Quality of life questionnaires results

Questionnaires were completed by owners of cats enrolled in CG and AG. Each owner completed two quality of life questionnaires: QoL1 (before treatment) and

QoL2 (after treatment). Owners were instructed to answer QoL1 first and then QoL2. For each question on QoL1, "before treatment" was written, and for each question on QoL2, "after treatment" was written. Only one owner answered the questionnaires for each cat, and both returned questionnaires were mandatory for inclusion in the study. The results of the CG are shown in Table 3 and the results of the AG are shown in Table 4.

Table 3. Responses of the owners of cats not treated with allergen-specific immunotherapy (control group; CG, No. = 6) before and after the treatment

No.	Question	B Mean ± St.dev.	A Mean ± St.dev.	p Value
1.	Severity of disease	3.333 ± 1.106	3.167 ± 1.067	S 0.1816
2.	Behavior / mood influence	3.0 ± 1.155	2.5 ± 1.118	MW 0.2764
3.	Sleep disruption	2.333± 0.745	1.833± 0.687	S 0.0878
4.	Meals disruption	2.167± 1.344	1.833±0.898	S 0.0873
5.	Playing / working disruption	2.667±1.106	2.333±0.745	MW 0.3385
6.	Social relationship disruption	2.667±1.106	2.333±0.745	MW 0.4656
7.	Change of habits	2.667 ±1.247	2.833±1.067	MW 0.4667
8.	Therapies	3.5 ± 0.764	3.5 ± 0.764	S 0.106
9.	Time loss	2.667±0.745	2.667±1.106	MW 0.4664
10.	Physical exhaustion	2.167 ± 0.687	2.167±1.067	MW 0.4664
11.	Family acivities disruption	2.333±0.943	2.333±1.106	MW 0.4670
12.	Expenditure influence	3.167±0.687	3.5 ± 0.5	MW 0.2380
13.	Emotional distress	3.5±0.5	2.833 ±0.687	MW 0.0687
14.	Physical uneasiness	3.167±1.067	2.833 ± 1.067	MW 0.3055
15.	Family relationship influence	1.833±1.067	2.333±0.943	MW 0.1755

Legend: S = Two Sided Student test; MW = Two Sided Mann Whitney test; B = before the treatment; A = after the treatment. The values were obtained by declaring a number for each answer (Not at all = 1, A little = 2, Quite a bit = 3, Very much = 4) and then the mean number and standard deviation = St.dev. for each question were calculated.

Statistical comparison of responses to QoL1 and QoL2 within CG revealed no significant differences (Table 1 and Figure 1). The various symptomatic treatments did not significantly improve the quality of life of the cats or their owners in any area of clinical presentation or behavior. While we found a trend toward improvement after therapy in the factors described in questions No.1, 2, 3, 4, 5, 6, 13, and 14, the effects of the therapies on quality of life remained the same (question No.8) and other quality of life factors worsened, such as change in habits, loss of time, physical exhaustion, disruption of family activities, impact on spending, and impact on family relationships (questions No.7, 9, 10, 11, 12, and 15, respectively). However, the observed differences were not statistically significant.

Table 4. Responses of the owners of cats treated with allergen-specific immunotherapy (AG, No. = 8) before and after the treatment

No.	Question	B Mean ± St.dev.	A Mean ± St.dev.	p Value
1.	Severity of disease	3.75 ± 0.661	2.375 ± 0.857	MW 0.0043
2.	Behavior / mood influence	2.75 ± 0.829	1.625 ±0.696	MW 0.0118
3.	Sleep disruption	2.375±1.11	1.25 ±0.433	S 0.0033
4.	Meals disruption	2.0 ±1.118	1.5 ± 0.707	S 0.0166
5.	Playing / working disruption	2.0 ±0.866	1.25 ±0.433	S 0.010
6.	Social relationship disruption	2.25 ± 1.09	1.625 ± 1.111	MW 0.1334
7.	Change of habits	2.5 ±1.118	2.0 ± 1.0	MW 0.2070
8.	Therapies	3.25 ± 0.829	2.75 ±0.968	S 0.0166
9.	Time loss	3.0 ± 1.0	2.625±0.857	MW 0.2026
10.	Physical exhaustion	2.625 ± 0.857	2.0 ±0.866	S 0.0056
11.	Family acivities disruption	2.0 ± 0.866	1.625 ±0.696	S 0.0698
12.	Expenditure influence	3.0 ±1.118	2.125 ± 1.053	S 0.0031
13.	Emotional distress	3.375±0.484	2.25 ± 0.968	S 0.0008
14.	Physical uneasiness	3.125 ± 0.927	2.75 ± 1.199	S 0.0985
15.	Family relationship influence	1.75 ± 0.968	1.875 ±0.781	S 0.2992

Legend: S = Two Sided Student test; MW = Two Sided Mann Whitney test; B = before the treatment; A = after the treatment. The values were obtained by declaring a number for each answer (Not at all = 1, A little = 2, Quite a bit = 3, Very much = 4) and then the mean number and standard deviation = St.dev. for each question were calculated.

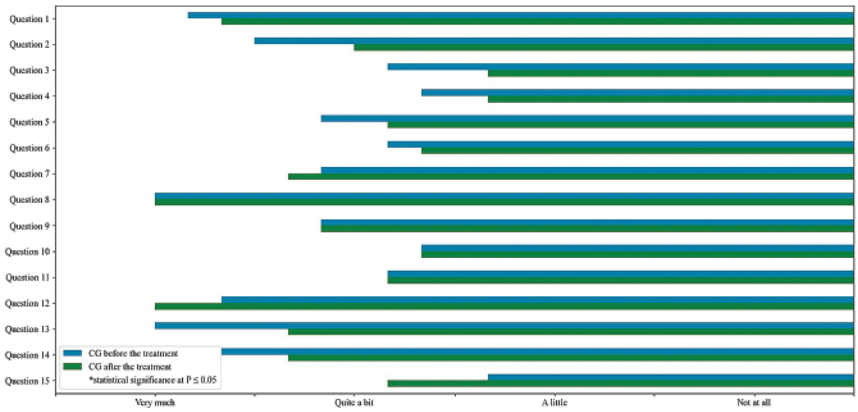


Figure 1. Statistical comparison of the quality of life of cats, not treated with ASIT (CG) before the treatment (QoL1 CG) and after the treatment (QoL2 CG). The mean values are represented in the figure.

Statistical comparison of responses to QoL1 and QoL2 within AG (Table 4) showed significant differences in questions No.1, 2, 3, 4, 5, 8, 10, 12, and 13 (Figure 2).

Under ASIT, disease severity decreased significantly, the disease affected the cats' behavior significantly less, they were in better moods, and their sleep, meals, and play activities were significantly less disturbed. Owners felt significantly less burdened by the therapies, were significantly less physically exhausted, and were less emotionally distressed. Owners' expenses were significantly lower compared to before ASIT treatment. In addition, a trend toward improvement after therapy was noted, although not statistically significant, for the factors described in all other questions except question No.15.

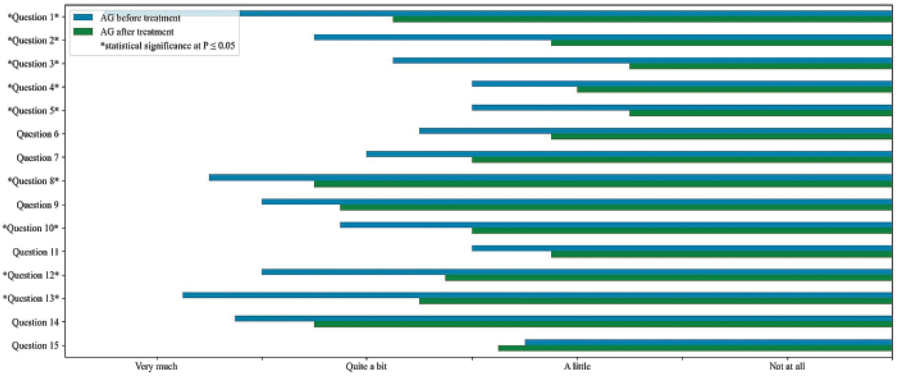


Figure 2. Statistical comparison of the quality of life of cats treated with ASIT (AG) before the treatment (QoL1 AG) and after the treatment (QoL2 AG). The mean values are represented and statistical significance at $p \leq 0.05$ is marked with *.

Finally, a statistical comparison of responses to QoL2 was performed between CG and AG (Figure 3). It was found that the interaction of the cats of AG with the environment and their play activities were significantly less disturbed by the disease

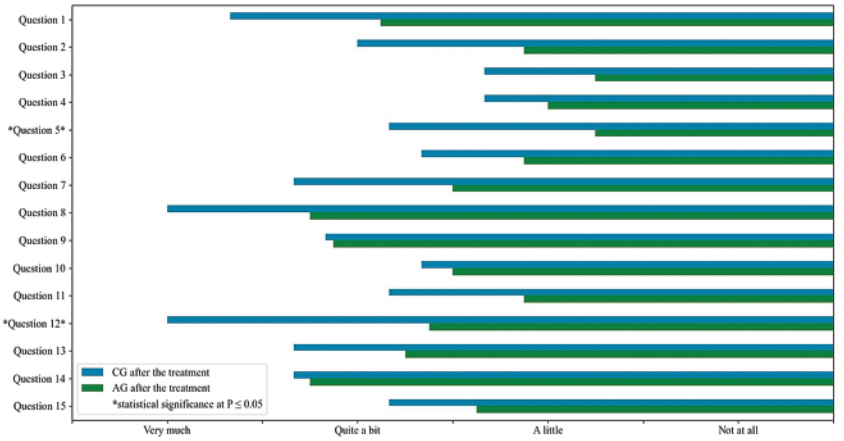


Figure 3. Statistical comparison of the quality of life of symptomatically treated cats (QoL2 CG) and ASIT-treated cats (QoL2 AG) after the treatment. The mean values are represented and statistical significance at $p \leq 0.05$ is marked with *.

compared to CG (question No.5). Cats treated with ASIT were significantly less lethargic and nervous, more playful, more curious, and more exploratory than cats not treated with ASIT. Owners of cats treated with ASIT felt that the disease had significantly less impact on their expenses, as the cost of treatment and veterinary visits was lower (question No. 12).

DISCUSSION

Atopy is a disease that is not curable in the majority of cases [13]. It can be managed quite well with symptomatic treatment or ASIT, supported by nutritional management, but long-term remission is very rarely achieved. It is estimated that ASIT may be effective in approximately 60 - 78% of cats that have undergone this therapy [22]. Quality of life of allergic cats, treated with ASIT, has not been evaluated yet.

Statistical comparison of responses to QoL1 questionnaires (before treatment) between the ASIT-treated group of cats and group of cats not treated with ASIT revealed any differences in any of the 15 questions. This means that both groups were comparable before treatment.

Statistical comparison of responses to QoL questionnaires within the control group before treatment and after treatment (QoL1 and QoL2, respectively; Table 3) showed no significant differences (Figure 1). According to our results the quality of life of cats and their owners did not improve significantly with the symptomatic treatments. Questionnaire on the quality of life that was used in our study has been used in cats with FASS in one study before [2]. In this study, authors have developed and validated this specific questionnaire. It was administered to owners of 45 cats with FASS and the correlation with overall disease severity, pruritus intensity and skin lesion expression was analyzed. In 31 allergic cats, QoL scores were obtained before and after therapy. Results showed that QoL correlated significantly with overall disease severity and pruritus, but not with intensity of skin lesion expression. In this study all scores decreased significantly with therapy. However, questions about the burden of therapy, veterinary visits, time loss, exhaustion, interruption of family activities, and expenses showed minor improvements [2]. Comparison with our results is limited because in the study by Noli et al. (2016), it was decided in advance to conduct the post-therapy quality of life questionnaire only if the cat was judged to have improved. Also it is not known whether ASIT was included in therapies. The results of our study showed no significant improvement by symptomatic therapy.

Statistical comparison of responses to QoL1 and QoL2 within the ASIT group (Table 4) showed significant differences in many quality of life determinants. After therapy, the cats' illness was significantly less disruptive; the cats were less lethargic, nervous, aggressive, and restrained than before treatment. Their sleep, meals, and play activities were significantly less disrupted. Cats treated with ASIT were significantly more playful, curious, and exploratory than before treatment. They felt significantly less

disturbed by consultations at the veterinary clinic and had fewer trips, manipulations, and injections. Owners of cats treated with ASIT felt significantly less tired than before treatment due to the extra care, cooking, etc. They felt significantly less guilt, powerlessness, sadness, regret, fear, anger, disgust, rage, or frustration than before ASIT treatment. The impact on owners' spending was significantly less than before treatment. In the study of Noli et al., 2016, improvements with treatment for more than 50 %, compared to before the treatment have been shown for almost identical questions. Improvement for more than 50 % is accepted as clinically relevant when estimating a therapy success rate [23].

Statistical comparison between AG and CG group after the treatment showed significant differences in questions numbered 5 and 12 (Figure 3). The cats' play activities and their interaction with the environment were significantly less disturbed in the ASIT group compared to CG after treatment. Owners of ASIT-treated cats felt their expenses were less affected by their cat's illness, compared to owners of cats not treated by ASIT. We need to appreciate that symptomatic treatment is used simultaneously with ASIT when needed and less symptomatic treatment is one of the goals of ASIT treatment [22,23].

The possibility of side effects (SE) with ASIT must be considered. In a recent questionnaire-based study, 37% of participating veterinarians reported SE associated with subcutaneous immunotherapy in cats. In the majority of cases, mild SE such as increased pruritus, vomiting, diarrhea, or local injection reactions were reported. Sporadically, severe SE such as respiratory distress, collapse, anaphylaxis, or sudden death were observed. It may be relevant to the occurrence of serious adverse events that 32.8% of cases in this study involved cats with FASS and/or feline asthma, and feline asthma carries a higher risk of serious SE [24]. No severe SE were observed in a recent study of sublingual immunotherapy in cats [15] or in cats treated subcutaneously with ASIT in our study.

The multiple clinical manifestations of FASS are not always well recognized and diagnosed by general practitioners [7]. This may affect the number of cats presenting to the referral clinic and consequently treated with ASIT. Over a 15-year period (2005 to 2020), serum IgE allergy testing was performed in 35 cats compared with 176 serologically tested dogs at the Small Animal Clinic of the Faculty of Veterinary Medicine in Ljubljana. In the same period, 209 ASIT drugs for dogs were prescribed at the Faculty of Veterinary Medicine in Ljubljana, compared with 6 prescriptions for cats (Table 1). Although most tests were positive in 35 cats tested (77.1%), only 22.2% of owners of positive cats opted for ASIT. These facts are due to the small number of cats involved in our study and undoubtedly represent a shortcoming of this study. It should also be noted that this was a retrospective study. This certainly may have influenced the results, as owners completed their questionnaires based on their recollections rather than immediately after completion of treatment. Some of the owners did not complete their questionnaires until years after completion of immunotherapy. There is a possibility that some of the events were forgotten by the

owners. On the other hand, long-term remissions after completion of immunotherapy might have been observed in this way.

However, to the best of the authors' knowledge, this is the first publication on the use of quality of life questionnaires in allergic cats treated with ASIT compared with allergic cats not treated with ASIT. Based on our results, we were able to demonstrate significant improvement in the quality of life of cats and their owners after allergen-specific immunotherapy compared with the quality of life before treatment, thus determining the primary outcome of the study. While in a control group of our cats, symptomatic therapy did not significantly improve quality of life in any respect, ASIT significantly improved quality of life in the majority of descriptions. We found significant differences in the quality of life of cats treated with ASIT compared with cats treated symptomatically, including better cat sleep and play activities and interaction with the environment. Owner expenses were significantly lower when cats were treated with ASIT compared with other therapies. Thus, we confirmed the second outcome of the study. Nevertheless, a large-scale prospective study is needed to confirm these data.

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Authors' contributions

Both authors participated in research planning and field data collection, data analysis, and writing of the manuscript. They have read and approved the final manuscript.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Statement of Informed Consent

The owner understood procedure and agrees that results related to investigation or treatment of their companion animals, could be published in Scientific Journal Acta Veterinaria-Beograd.

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KVALITET ŽIVOTA KOD ALERGIČNIH MAČAKA TRETIRANIH ALERGEN- SPECIFIČNOM IMUNOTERAPIJOM – RETROSPEKTIVNA STUDIJA

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Sindrom atopijske kože mačaka (eng. *Feline atopic skin syndrome* - FASS) opisuje alergijske kožne bolesti kod mačaka koje su povezane sa osetljivošću na alergene iz okoline. Alergen-specifična imunoterapija (ASIT) ima za cilj smanjenje ili eliminisanje simptoma povezanih sa naknadnim izlaganjem uzročnom alergenu. Primarni ishod ove studije bio je da se utvrdi da li se kvalitet života (QoL) mačaka i vlasnika poboljšao kao rezultat ASIT-a. Sekundarni ishod je bio da se utvrdi da li se kvalitet života poboljšao kod mačaka lečenih ASIT-om u poređenju sa mačkama tretiranim simptomatski.

Osam mačaka je uključeno u ASIT grupu (AG) i 6 mačaka u kontrolnu grupu (CG). Vlasnici mačaka su retrospektivno popunili validirane upitnike o kvalitetu života za period pre i posle tretmana. Kvalitet života mačaka se značajno poboljšao sa ASIT-om. Mačke su bile znatno manje lenje, nervozne, agresivne, suzdržane, manje su se čistile dok su spavale i manje se skrivale, manje su ih uznemiravali veterinarski pregledi, bile su razigranije i interaktivnije sa okolinom i imale su bolji apetit nego pre lečenja. Vlasnici su se osećali znatno manje umornim i emocionalno uznemirenim u poređenju sa pre tretmana i njihovi troškovi su bili znatno niži. Naprotiv, različite simptomatske terapije nisu značajno poboljšale kvalitet života mačaka ili njihovih vlasnika ni u jednom od uslova. Nisu primećeni ozbiljni neželjeni efekti sa ASIT. Kvalitet života životinja obolelih od hroničnih bolesti je važan jer određuje odluke vlasnika i veterinara o modalitetima doživotnog lečenja. Validirani upitnici se još uvek retko koriste u veterinarskoj praksi i istraživanjima.