

Feline atopic dermatitis: a retrospective study of 45 cases (2001–2012)

Philippa A. Ravens*, Bei J. Xu† and Linda J. Vogelnest*

*Small Animal Specialist Hospital, Level 1, 1 Richardson Place, North Ryde, NSW 2113, Australia

†University of Sydney Veterinary Teaching Hospital, 410 Werombi Road, Brownlow Hill, NSW 2570, Australia

Correspondence: Philippa A. Ravens, Small Animal Specialist Hospital, Level 1, 1 Richardson Place, North Ryde, NSW 2135, Australia.

E-mail: pravens@sashvets.com

Background – Atopic dermatitis (AD) is recognized as a common cause of pruritus in cats, but it remains incompletely characterized.

Hypothesis/Objectives – The aim of the study was to evaluate cases of confirmed feline AD.

Animals – Forty-five cats from a dermatology referral practice (2001–2012).

Methods – A retrospective case record review was carried out using strict diagnostic criteria, including exclusion of flea-bite hypersensitivity and adverse food reaction.

Results – Disease prevalence was 12.5%, with domestic mixed ($n = 24$), Abyssinian ($n = 6$) and Devon rex ($n = 3$) cat breeds predisposed. Median age of onset was 2 years (62% <3 years; 22% >7 years; range 3 months to 12 years). Common presentations were severe (82%), nonseasonal (82%), waxing/waning (36%) pruritus, with alopecia/crusting/excoriations and/or erosions/ulceration (73%). Miliary dermatitis (20%) and eosinophilic granuloma complex lesions (27%) occurred. The face/head (71%), ventral abdomen (51%), neck (51%), limbs (38%), pinnae (31%), dorsum/rump (31%) and feet (16%) were frequently affected sites; lesions were restricted to the head/neck in only five cats (11%). Concurrent otitis externa (16%), superficial bacterial pyoderma (49%), *Malassezia* dermatitis (7%), flea-bite hypersensitivity (24%) and adverse food reaction (13%) occurred. Strong reactions on intradermal allergen testing were common (68%; 19 of 30), most frequently to pollens (61%) and/or insects (46%). Good response to ciclosporin (100%; 10 of 10), systemic glucocorticoids (55%; 22 of 40) and allergen-specific immunotherapy (57%; 13 of 23) and good/partial response to antihistamines (67%; 22 of 33) were reported.

Conclusions and clinical importance – The prevalence of feline AD was higher than previously suggested, and breed predispositions were confirmed. Severe nonseasonal pruritus was most common, with a varied spectrum of lesions affecting a range of body areas.

Introduction

Feline atopic dermatitis (AD) is suggested to be the second most common allergic dermatosis in cats.¹ Despite reported clinical similarities to canine and human AD and being referenced as feline AD in textbooks² and reviews,³ there is some recent disagreement on nomenclature due to limited current understanding of the pathogenesis.⁴ Increased CD4⁺ T cells, interleukin-4⁺ cells and CD1a⁺ dendritic cells in lesional and/or nonlesional skin and in affected compared with healthy cats are similar to findings in canine and human AD, supporting a role for T-helper 2-mediated immune dysfunction.³ However, a confirmed role for immunoglobulin E (IgE) in feline AD is more controversial,⁵ and despite numerous recent advancements in the understanding of canine AD, very little research has focused on the pathogenesis of feline AD to date.

Feline AD is anecdotally characterized by seasonal or nonseasonal pruritus, and affected cats are reported commonly to exhibit one or more lesional patterns, including symmetrical alopecia, miliary dermatitis, focused head and neck pruritus and eosinophilic granuloma complex (EGC) lesions.^{2,4} Young cats are reported to be predisposed, with clinical signs often developing before 3 years of age, although a wide age range is noted.^{2,6} No sex or breed predilections have been identified, and evidence of inheritance is restricted to a single report of AD occurring in three domestic short hair (DSH) littermates,⁷ in contrast to canine and human AD, for which there are well-established genetic links.²

The disease is currently diagnosed based upon a compatible history and clinical presentation, with exclusion of other pruritic dermatoses.² However, there are no widely established clinical diagnostic criteria as there are in dogs.⁸ Studies and case reports focusing on detailed descriptions of feline AD are also limited,^{4,7,9,10} with only one report of three cats that provides trial details for exclusion of both flea-bite hypersensitivity (FBH) and adverse food reactions (AFRs),⁷ which are recognized as

Accepted 28 November 2013

Sources of Funding: This study was self-funded.

Conflict of Interest: No conflicts of interest have been declared.

important mimicking dermatoses.^{2,4} The aim of this retrospective study was to review records of cats from a referral practice meeting current diagnostic criteria for feline AD. The primary objective was to evaluate historical, clinical and diagnostic features of cats with confirmed AD. A secondary objective was to evaluate the anecdotal response to selected therapies in this group of cats.

Materials and methods

The computer records of cats seen by the dermatology referral service at two University of Sydney Veterinary Teaching Hospitals, at the Sydney and Camden campuses, from January 2001 to March 2012, were searched in a structured template system (Animal Intelligence™ Software; Animal Intelligence Software, Inc., Washington, DC, USA) using the keywords 'feline' for animal species and 'atopy' for differential diagnosis.

Inclusion criteria included a compatible history of relapsing or persistent pruritus or lesions not explained by other diseases, clinical findings of skin lesions consistent with hypersensitivity and/or secondary microbial infections and exclusion of other potential pruritic diagnoses. A minimal follow-up of 12 months was required, and all cats must have had persistence of pruritus/lesions despite completing a minimal 4 week intensive flea control trial and a minimal 6 week elimination diet trial followed by provocative rechallenge, to exclude FBH and AFR, respectively. In addition, all cats with pruritus not clearly responsive to parenteral or oral anti-inflammatory glucocorticoid (GC) therapy must have shown no response to miticidal treatment trials.

Flea control trials consisted of the following three components: treatment of affected cats with topical imidacloprid (Advantage®; Bayer, Pymble, NSW, Australia) or fipronil (Frontline Plus®; Merial, Parramatta, NSW, Australia) each for 2 weeks, and additional daily oral nitenpyram (Capstar®; Novartis, North Ryde, NSW, Australia) in cats with high levels of flea exposure; treatment of other household dogs and cats with a monthly adulticide (e.g. imidacloprid or fipronil); and environmental control using targeted treatment of all pet areas with an insect growth regulator (e.g. fenoxycarb or methoprene) environmental insect spray. The dietary trials typically consisted of a minimal 6 week home-prepared novel protein diet (e.g. kangaroo or rabbit with or without potato). A commercial hypoallergenic diet (e.g. Feline z/d®; Hill's Pet Nutrition, Macquarie Park, NSW, Australia) was fed to some cats that did not accept fresh food diets. All cats subsequently underwent provocative dietary challenge with a selection of previously fed foods. Food allergy was excluded if there was no obvious return of the original clinical signs after 2 weeks of provocative rechallenge.

Cats with reduction in pruritus during either or both flea treatment and dietary trials must have had persistence of notable pruritus despite at least 8 weeks of sustained high-level flea control and/or 8–12 weeks of sustained dietary control as indicated to meet inclusion criteria for AD. Concurrent FBH was considered confirmed if there was partial response to flea control trials and strong reactions to flea allergen with intradermal (IDT) or serum allergen-specific IgE testing, and suspected if either but not both of these criteria were met. Concurrent AFR was considered confirmed if there was at least partial response to diet restriction, obvious deterioration during the rechallenge phase and response to repeat diet restriction.

Miticidal treatment trials to rule out parasitic mites, including *Otodectes*, *Cheyletiella* and fur mites, consisted of topical application of imidacloprid/moxidectin (Advocate®; Bayer) or selamectin (Revolution®; Pfizer Animal Health, West Ryde, NSW, Australia) each 2 weeks for three treatments for all household cats and dogs. *Demodex gato* has not as yet been recognized in the study area, and appropriate treatment trials were not performed.

The historical data collected from eligible cases included signalment (breed, sex and neuter status), estimated age of disease onset, seasonality, pruritic features (degree, location and manifestation), noncutaneous organ involvement and the presence of concurrent FBH and/or AFR. The clinical data collected included cutaneous and

auricular lesions (type and location). The diagnostic test results evaluated included skin surface and ear cytology and IDT or allergen-specific serum IgE testing when performed.

Ear canal erythema and/or excessive auricular discharge with otic irritation were considered consistent with otitis externa. The presence of yeast (>1 per oil immersion field (oif)) and/or bacteria (typically >2–3 per oif) were considered to represent secondary ear canal infections. Superficial bacterial pyoderma (SBP) was diagnosed if neutrophils and intracellular bacteria were present on skin surface adhesive tape impressions, and *Malassezia* dermatitis was diagnosed with increased numbers of yeast (typically ≥ 1 per oif). Intradermal allergen testing was performed under medetomidine sedation (Domitor®; Zoetis, West Ryde, NSW, Australia; 20–30 µg/kg intravenously) and using Greer allergens (supplied by Dermcare, Springwood, Queensland, Australia). The typical panel of allergens over the study period consisted of 45 pollens (1000 or 2000 PNU/mL), six insects [flea (1:100 w/v); and mosquito, ant, moth, horse fly and house fly (1000 PNU/mL)], two dust mites [*Dermatophagoides farinae* and *Dermatophagoides pteronyssinus* (three concentrations: 1:4000 w/v, 1:10,000 w/v and 1:25,000 w/v)], two miscellaneous allergens [mixed feathers and grain mill dust (1000 PNU/mL)], four moulds (1000 PNU/mL) and three storage mites (1:10,000 w/v). Intradermal testing was scored subjectively (range from zero to four) compared with sterile saline and histamine phosphate as negative and positive controls, respectively. Scores of three or four were designated strong positive reactions and scores of two as moderate reactions.

The response to allergen-specific immunotherapy was evaluated if recorded and continued for a minimum of 12 months. The response to anti-inflammatory therapies [glucocorticoids (GC), antihistamines or ciclosporin] and/or antimicrobial therapies for secondary infection were also evaluated if used. Response to therapies was based on the authors' assessment of clinical response and the client's assessment of progress as recorded in the database. Responses were designated as 'good' if there was a marked reduction or resolution of clinical lesions and reduction or discontinuation of ongoing symptomatic medications, 'partial' if there was a reduction in clinical lesions but only some reduction of concurrent antipruritic drugs, and 'no response' with no apparent change to lesions/pruritus and/or need for symptomatic medications.

The prevalence of feline AD was determined within the base dermatology referral feline population, and potential breed and sex predilections to AD were evaluated against the total feline hospital population. Data analyses were conducted using Minitab® statistical software version 15 (Minitab Inc., Sydney, NSW, Australia). Pearson's chi-square test and Fisher's exact test were used to test for associations between breed and sex with AD. Odds ratio (ORs) were calculated using a binary logistic regression test, and 95% confidence intervals (CIs) were reported. A *P*-value of <0.05 was considered statistically significant.

Results

Prevalence and signalment

The electronic search identified 225 cats with atopic dermatitis listed as a differential diagnosis, of which 45 cats met all of the inclusion criteria, representing 12.5% of all feline dermatology patients (*n* = 359). During the same period, there were 12,265 feline patients in total presenting to the two teaching hospitals (referral and primary accession services). Atopic dermatitis was confirmed in 12 breeds (Table S1 in Supplementary material). Domestic mixed breed cats (domestic short hair, medium hair and long hair combined) accounted for 53% (*n* = 24) of cases, pure breeds for 44% (*n* = 20), and there was one pure breed mix. The Abyssinian (*n* = 6, 13%), Burmese (*n* = 3, 7%) and Devon rex breeds (*n* = 3, 7%) were the most represented pure breeds, with the Abyssinian and

Devon rex pure breeds and domestic mixed breeds being significantly over-represented compared with the total feline hospital population. There was no significant difference in sex distribution compared with the total hospital population. All 45 cats meeting the inclusion criteria were neutered at the time of data collection. However, the neuter status of cats at the time of development of AD, and indeed the neuter status of all cats at the time of first presentation to the base hospital, may have varied from their neuter status as recorded at the time of data collection; thus, the influence of neuter status on the development of AD could not readily be assessed.

The estimated age of onset of clinical signs ranged from 3 months to 12 years, with a median age of onset of 2 years (95% CI 18–56 months). Clinical signs first developed before 3 years of age in 62% ($n = 28$) of cats and after 7 years of age in 22% ($n = 10$) of cats.

Pruritus

Pruritus was evident to owners in 42 cats (93%) and inapparent in three cats (7%). Trichograms confirmed broken hairs consistent with pruritic behaviour in the latter three cats, and other differentials were excluded according to the inclusion criteria. The owner-perceived degree and sites of pruritus were recorded for most cats. Pruritus was reported as severe ($n = 37$, 82%), moderate ($n = 2$, 4%) or mild ($n = 3$, 7%). Pruritic manifestations recorded included licking ($n = 28$, 62%), scratching ($n = 26$, 58%), biting/chewing/nibbling ($n = 25$, 56%), increased self-grooming ($n = 16$, 36%), foot shaking ($n = 2$, 4%) and nail plucking ($n = 2$, 4%).

Seasonality

The majority of cats ($n = 36$, 80%) presented with non-seasonal clinical signs, of which 16 cats (36%) had constant pruritus, 15 cats (33%) had waxing and waning pruritus and five cats (11%) had intermittent signs. Eight cats (18%) had distinctly seasonal clinical signs, with complete resolution between flares.

Clinical presentation

Cutaneous lesions and their distribution are detailed in Table 1. Common presentations included patchy alopecia, crusting and excoriations ($n = 29$, 64%) and/or more severe self-trauma with erosions and/or ulceration ($n = 9$, 20%). Twelve cats (27%) were reported with EGC lesions, consisting of eosinophilic plaques ($n = 7$), eosinophilic granulomas ($n = 4$) and rodent ulcers ($n = 4$), with four cats having more than one type of lesion. Miliary dermatitis was reported in nine cats (20%), three of which also had EGC lesions; however, this was only present as the sole lesion type in two cats (4%). Alopecia and/or erythema without gross skin trauma ($n = 5$, 11%) was a less common presentation.

Pruritus and/or cutaneous lesions were recorded at a variety of anatomical locations, with a multifocal distribution commonly being observed. The face/head was the most frequently affected site ($n = 32$, 71%), including pinnae ($n = 14$, 31%), pre-auricular area ($n = 19$, 42%), peri-ocular area ($n = 10$), lips ($n = 9$), chin (6), muzzle/cheek ($n = 4$) and dorsal head ($n = 2$). The ventral abdo-

men ($n = 23$, 51%), neck ($n = 23$, 51%), limbs ($n = 17$, 38%), dorsum or lumbosacral area ($n = 14$, 31%), medial thighs ($n = 9$, 20%) and feet ($n = 7$, 16%) were also affected. The head and/or neck were the sole focus of pruritus and/or lesions in only five cats (11%). The dorsum or lumbosacral area was affected in eight cats without concurrent FBH.

Other clinical signs

Otitis externa was diagnosed in seven cats (16%), one of which also had otitis media. Three cats were identified with microbial overgrowth, including the cat with otitis media/externa (rods $n = 1$) and two cats with solely otitis externa (yeast $n = 1$, and yeast and cocci $n = 1$). Four cats had allergic otitis without complicating microbial overgrowth. Lymphadenomegaly (not associated with other apparent disease) was observed in two cats with AD alone, and resolved with control of AD. Respiratory signs attributed to allergy (asthma, wheezing and coughing) were reported in two cats with AD alone, and in one cat with concurrent AD, FBH and AFR. Ocular signs attributed to allergy (e.g. epiphora and conjunctivitis) were present in two cats. Recurrent facial swelling/oedema (angioedema) was the major clinical presentation in one cat with AD alone.

Concurrent dermatoses

Secondary SBP was confirmed in 22 cats (49%), concurrently with *Malassezia* dermatitis in three cats (7%; Table 1). These data were sourced from the same study population as a previously published report on feline pyoderma.¹¹ Twenty-nine cats (64%) in the study were diagnosed with AD as the only primary dermatosis, while six cats (13%) had concurrent AFR and 11 cats (24%) had suspected ($n = 5$) or confirmed concurrent FBH ($n = 6$, one of which also had AFR).

Intradermal allergen testing and serum allergen-specific IgE testing

Thirty cats had IDT performed, with strong positive reactions recorded for 19 cats (68% of cats tested). Withdrawal of potentially interfering drugs, including GC and antihistamines, was completed for all cats in line with current canine guidelines (systemic GC, minimum of 4 weeks for short-acting and 8 weeks for long-acting preparations; antihistamines and topical GC, 2 weeks). The most prevalent strongly reacting allergens were pollens (grass, weed and/or tree; $n = 17$, 61%), followed by insects ($n = 13$, 46%), including flea ($n = 8$, 29%) and, less frequently, dust mites [$n = 7$, 25%; *D. farinae* ($n = 5$, 18%); *D. pteronyssinus* ($n = 4$, 14%)], moulds ($n = 3$, 11%), mixed feathers ($n = 1$, 4%), storage mites ($n = 1$, 4%) and grain mill dust ($n = 1$, 4%). A majority of cats were positive to a combination of allergen types ($n = 15$, 54%), of which combined pollen and insects ($n = 6$) was the most frequent combination. Fourteen of the 19 cats with strong reactions on IDT reacted to eight or fewer allergens, and only four cats had more than 10 strong reactions. Three cats had strong reactions to at least one mould allergen, while none had strong reactions to dust mites alone. One cat had serum IgE testing performed (Heska Allercept® IgE Test; Gribbles Veterinary

Table 1. Signalment, lesional data and concurrent dermatoses in 45 cases of feline atopic dermatitis presenting to a dermatology referral service in Sydney, NSW, Australia

Cat no.	Breed	Sex	Age of onset	Lesion type	Lesion distribution	Concurrent dermatoses
1	Russian blue	FN	9 years	Alopecia, crusting, erosions, ulceration	Ventral abdomen, axillae, medial thighs, lumbosacral region, limbs	SBP
2	DSH	FN	11.5 years	Alopecia, crusting, erosions, ulceration	Face, neck, dorsum, flanks, limbs	SBP
3	DSH	MN	3 years	Erythema, erosions, ulceration, otitis externa	Face, pinnae, limbs	SBP
4	Burmese	FN	12 years	Alopecia, crusting, erythema	Face, ventral abdomen, inguinal region, limbs	—
5	DSH	MN	6 years	Alopecia, crusting, erythema	Face, pinnae	—
6	Abyssinian	MN	1 year	Alopecia, crusting, erythema, LN	Neck, pinnae, dorsum, limbs	—
7	DSH	FN	1.5 years	Alopecia, erythema, erosions, ulceration	Neck, dorsum, medial thighs	—
8	DSH	FN	7 years	Alopecia, crusting, erosions, ulceration	Face, pinnae, neck, limbs	—
9	DSH	FN	7 months	Alopecia, crusting, excoriations	Face, pinnae, neck, ventral abdomen, medial thighs	—
10	Devon rex	MN	3 months	Alopecia, excoriations, miliary dermatitis, EG, LN, respiratory	Head, neck, dorsum, flanks	—
11	DSH	MN	2.5 years	Alopecia, crusting, erythema, otitis externa, ocular	Face, pinnae, neck	SBP, MD
12	Abyssinian	FN	9 months	Alopecia, erythema, excoriations, EP	Neck, axillae, ventral abdomen, inguinal region, limbs	SBP
13	DMH	MN	15 months	Alopecia, crusting, erythema	Face, pinnae	SBP
14	Ragdoll	FN	4 months	Alopecia, erythema, excoriations	Face, neck, ventral abdomen, medial thigh	SBP
15	DSH	FN	10 years	Alopecia, erythema, EG, EP	Ventral abdomen, lumbosacral region	SBP
16	DSH	MN	12 years	Erythema, RU	Face, ventral abdomen, feet	SBP
17	Abyssinian	FN	3.5 years	Alopecia, crusting, erythema, EP	Face, pinnae, neck, ventral abdomen, medial thighs	SBP
18	DSH	FN	10 years	Alopecia, erythema, RU, EP, miliary dermatitis	Face, pinnae, neck, ventral abdomen, limbs	SBP
19	Devon rex	MN	6 months	Miliary dermatitis, respiratory	Face, pinnae, dorsum, limbs, feet	SBP, MD
20	DLH	FN	9 years	Alopecia, crusting, otitis externa, miliary dermatitis	Head, neck, dorsum	SBP
21	DSH	MN	2 years	Alopecia, crusting, erythema, otitis externa, EG, EP	Face, ventral abdomen, dorsum, medial thigh, feet	SBP
22	Ragdoll	FN	1 year	Crusting, erythema, erosions, ulceration, otitis externa	Face, pinnae, ventral abdomen, perineum	SBP
23	DSH	FN	6 months	Miliary dermatitis, angioedema	Head, neck	—
24	Maine coon	FN	5 years, 3 months	RU	Face (lip)	—
25	DLH	FN	9 months	Alopecia, erythema	Neck, limbs	—
26	Oriental shorthair	FN	8 months	Alopecia	Ventral abdomen/chest, flank, inguinal region	SBP
27	Devon rex	FN	1.5 years	Erythema, erosions, ulceration, papules	Ventral abdomen/chest, axillae, medial thighs	—
28	Abyssinian	MN	8–9 years	Alopecia, EP, otitis externa	Ventral abdomen, medial thighs	SBP
29	Abyssinian	FN	<3.5 years	Alopecia, EP	Axillae, inguinal region	—
30	Persian	FN	4 years, 8 months	Alopecia, erythema, excoriations, miliary dermatitis	Face, pinnae, neck, dorsum	SBP, FBH*
31	DSH	MN	1.5 years	Alopecia, erythema, excoriations	Face, neck, dorsum, ventral abdomen, feet	FBH*
32	Himalayan	FN	9 months	Alopecia, erythema, excoriations	Face, neck, ventral abdomen	SBP, FBH*
33	Manx	MN	2 years	Alopecia	Ventral abdomen, limbs	FBH*
34	DSH	MN	1.5 years	Alopecia, crusting, erythema, otitis externa	Face	FBH

Table 1. (Continued)

Cat no.	Breed	Sex	Age of onset	Lesion type	Lesion distribution	Concurrent dermatoses
35	Abyssinian	MN	2 years	Alopecia, erythema	Ventral abdomen, dorsum, flanks, medial thighs, limbs	FBH
36	DSH	FN	1 year	Alopecia, crusting, erythema, ocular	Face, ventral abdomen, medial thighs, perineum	FBH, SBP, MD
37	Siamese cross	FN	9 years	Alopecia	Lumbosacral region	FBH
38	DSH	MN	2 years	RU	Lips, palatine arch	FBH
39	DSH	FN	6 months	Alopecia, crusting, EG, miliary dermatitis	Pinnae, neck, limbs, feet	FBH*
40	Burmese	FN	4 years, 6 months	Alopecia, erythema, crusting	Neck, ventral abdomen/ chest, axillae, limbs	AFR
41	DSH	FN	1 year	Alopecia, erythema, crusting, miliary dermatitis	Face, ventral abdomen, medial thighs, limbs, feet, tail	AFR
42	Burmese	MN	9 months	Alopecia, erythema, erosions, ulceration	Face, pinnae, neck, ventral abdomen	SBP, AFR
43	DSH	FN	8 months	Alopecia, crusting	Face, neck, limbs	AFR
44	DMH	MN	9 years	Alopecia, crusting, erosions, ulceration, miliary dermatitis	Face, neck, dorsum	SBP, AFR
45	DSH	FN	3 years	Alopecia, crusting, erythema, respiratory	Face, ventral abdomen, axillae, limbs, feet	AFR, FBH

Abbreviations: AFR, adverse food reaction; DLH, domestic long hair; DMH, domestic medium hair; DSH, domestic short hair; EG, eosinophilic granuloma; EP, eosinophilic plaque; FBH, flea-bite hypersensitivity (*suspected but not confirmed); FN, female spayed; LN, lymphadenomegaly attributed to skin disease; MD, *Malassezia* dermatitis; ocular, ocular signs attributed to allergy (e.g. epiphora and conjunctivitis); MN, male neutered; respiratory, respiratory signs attributed to allergy (e.g. wheezing and coughing); RU, rodent ulcer; and SBP, superficial bacterial pyoderma.

Pathology, Clayton, Victoria, Australia), with positive responses to dust and storage mites and flea.

Response to therapies

A variety of treatment regimens were used for the 45 cats with AD, including topical and systemic (oral or parenteral) GC, antihistamines, ciclosporin, antibiotics, antifungals and allergen-specific immunotherapy. Of the 42 cats (93%) receiving GC, 27 had received systemic agents alone and 15 had received a combination of systemic and topical agents. Twenty-two cats (55% of cats receiving systemic GC) reportedly had a 'good' response to systemic GC therapy, 10 cats (37%) a 'partial' response and eight cats (3.7%) a 'poor' response.

Topical GC therapies were less scrutinized across all cats; however, potent agents, including mometasone furoate (Elocon®; MSD, South Granville, NSW, Australia) and hydrocortisone aceponate (Cortavance®; Virbac, Milperra, NSW, Australia), were noted to provide good control of pruritus in some cats.

Several type I antihistamines were reportedly used in 31 cats (71%). An apparent 'good' response was reported in two cats (6%), 'partial' response in 20 cats (59%) and 'poor' response in 11 cats (34%). Inconsistent response to the same drug was also reported. Loratadine ($n = 19$; ~0.5 mg p.o. per cat; Claratyne®; MSD) and cetirizine ($n = 18$; ~5 mg p.o. per cat; Zyrtec®; Johnson & Johnson Pacific Pty Limited, North Ryde, NSW, Australia) were the most commonly used antihistamines, with loratadine being more frequently reported to produce a good ($n = 1$) or partial response ($n = 8$).

Ciclosporin (Neoral® or Atopica®; Novartis) provided good control of AD signs in all 10 cats where this therapy was reported. Serious adverse health events occurred in

three cats undergoing ciclosporin therapy and were considered likely to be linked to the immunosuppressive effects of this drug. One cat developed localized nasal nodular cryptococcosis after ~12 months of ciclosporin therapy (4.1 mg/kg p.o. once daily to every second day). A second cat developed malaise and respiratory distress after more than 2 years of ciclosporin therapy (doses ranged from 2.1 to 4.2 mg/kg p.o. once daily). Fine-needle aspirates of a lung mass evident on radiographs revealed *Toxoplasma gondii* organisms. A third cat died in hospital after developing malaise, pyrexia and respiratory signs after more than 12 months of ciclosporin therapy (~5 mg/kg p.o. once daily) considered potentially consistent with toxoplasmosis, although no serology or other testing were performed to confirm this suspicion. Information on outdoor access in these cats was not available. The second and third cats had previously been fed raw meat, and it was advised to feed only cooked or previously frozen meat when ciclosporin therapy was commenced. The first two cats had been administered systemic GC prior to, but not immediately before or concurrently with ciclosporin therapy. The third cat had been given 2 mg/kg prednisolone p.o. approximately every 10 days in conjunction with ciclosporin therapy. None of the three cats had *T. gondii* titres assessed prior to starting ciclosporin.

Antimicrobial therapies were employed in all cats with confirmed secondary bacterial and/or yeast infections, most typically cefalexin or amoxicillin clavulanate for bacterial infections and ketoconazole for *Malassezia* dermatitis. Additional topical agents (e.g. mupirocin, silver sulphadiazine or chlorhexidine 2.5% solution) appeared to be important for resolution of infections in some cats. Anti-inflammatory treatments other than antihistamines were delayed until resolution of infections in most cats,

but in some more severely pruritic cats, concurrent GC or ciclosporin therapies were ultimately required to control underlying AD and facilitate adequate control of secondary infections. Of the 21 cats that received systemic antibiotics, the associated reduction in pruritus was considered 'good' in six cats (28.5%), 'partial' in six cats (28.5%) and 'poor' in nine cats (43%). As outlined above, some cats ultimately required concurrent administration of other medications to control clinical signs. Elizabethan collars or conforming bodysuits (e.g. modified baby clothing) were used in many cats to limit severe self-trauma until good control of pruritus was achieved.

Allergen-specific immunotherapy was commenced in 26 cats based on positive allergen testing results (25 based on IDT and one based on serum testing). Of 23 cats that had completed at least 12 months treatment before evaluation, 'good' response was reported in 13 cats (57%; including the one cat based on serum test results), 'partial' response in six cats (26%) and 'poor' response in four cats (17%).

Discussion

In this study, we determined several important findings on feline AD. Disease prevalence within a dermatology referral population was higher than previously suggested, and domestic mixed breeds, Abyssinian and Devon rex cats were predisposed. Although age of onset was often young (<3 years), it was not uncommon in older cats (>7 years in 22% of cats). Pruritus was most typically severe, nonseasonal, waxing and waning and was less GC responsive than previously suggested ('good' in 55%). Pruritus was found to affect a wider range of body areas than previously suggested,² including the face/head, ventral abdomen/axillae, dorsal trunk and limbs/feet. Strong positives were not uncommon on IDT (in 68% of cats tested), with pollens and insects the most prevalent strongly reacting allergens. Good response to immunotherapy was perceived in slightly over 50% of cats undergoing allergen-specific immunotherapy.

The true prevalence of AD within this study population is likely to be higher than that determined, because a number of cats with suspected AD did not meet the strict inclusion criteria. In particular, the reliance on owner compliance to facilitate diagnostic trials limited recognition of all cases, with only 45 cats meeting criteria from a possible 225 cats where AD was considered possible. Similar challenges to diagnosis in clinical practice are recognized.² The lower suggested prevalence in a previous study of a dermatology referral feline population (5.6%)¹² may relate to geographical variations in disease occurrence, under-recognition of true disease occurrence within referral populations previously reported, biased occurrence in a referral practice or increasing prevalence, as documented in human AD and suspected in canine AD.²

Documentation of breed predispositions to feline AD concurs with findings in canine AD.^{2,13} Previous reports of possible breed predilection in feline AD were not found amongst peer-reviewed studies. The small number of cats belonging to pure breeds within this study and the small number of confirmed cases of AD in total in the

study population make these findings less reliable. The apparent predisposition of domestic mixed breeds to feline AD is an interesting finding and, assuming this is confirmed in larger studies, it remains to be determined whether this relates to conserved genetic links, shared environmental influences or other unknown factors.

Although the finding of a mean age of onset of 2 years agrees with most previous reports,² the development of the first clinical signs of AD after 7 years of age in more than 20% of cats in this study was unexpected. A spike of disease occurrence for superficial pyoderma with concurrent AD has also been recognized in older cats in the same population.¹¹

This study confirms pruritus as a prominent feature of feline AD; frequently, the pruritus was severe, causing marked self-trauma. As mentioned, the use of Elizabethan collars and/or conforming body suits was required to limit self-trauma during diagnostic trials and early treatment stages in some cats, and the authors recognize that this is needed more often in feline AD patients than in their atopic canine counterparts. The severity of pruritus may be partly attributable to secondary infections and/or concurrent hypersensitivities in at least some cats. Furthermore, the degree of pruritus was subject to owner interpretation in this study, which may not be as reliable as utilization of a standardized pruritus scoring system.

Although defined cutaneous reaction patterns are frequently quoted in association with hypersensitivities in cats,^{2,10} a wider spectrum of presentations was recognized in this study, and combinations of patterns were frequent. Self-trauma presentations were most common, present in 20% of cats with severe erosive to ulcerative lesions. Head- and/or neck-focused pruritus has been suggested as the most common presentation of feline AD,² and although many cats in this study had the head and/or neck affected, pruritus was restricted to these areas in only five cats (all without concurrent AFR). Likewise, symmetrical noninflammatory alopecia was relatively rare, and although EGC lesions and miliary dermatitis were reasonably common, they were usually present in association with other lesions. While EGC lesions were most common in cats with AD alone, miliary dermatitis was more common with concurrent AFR and/or FBH.

The distribution of lesions and pruritus was likewise more widespread in many cats in this study than previously reported,^{2,10} with the ventral abdomen, dorsum/lumbosacral area, axillae, medial thighs and limbs/feet being frequently affected sites in addition to the face/head/neck. Of note, dorsum/lumbosacral area involvement has previously been suggested to be more indicative of FBH in some studies,^{4,6} but was present in eight cats with AD alone in this study. Pinnal involvement is less frequently reported in feline AD,^{4,10,14} although it was common in this study and appeared to be more characteristic of AD, because only three of 14 affected cats with pinnal lesions had concurrent hypersensitivities (two with FBH and one with AFR). Paw involvement is rarely reported in cats with AD despite being common in canine AD,^{2,10} although it was more often associated with concurrent hypersensitivities (three with FBH and two with AFR) than AD alone in this cohort of cats.

Noncutaneous signs of otitis externa, ocular disease, respiratory disease and lymph node enlargement, as occurred in some affected cats in this study, have previously been reported as rare manifestations of feline AD.^{2,10} Both ocular and respiratory disease, in particular, could have been more frequent in cats in this study, because focused questioning of owners on these manifestations was not part of the computerized history template throughout the study period.

Although IDT and serum allergen-specific IgE testing in cats, as in dogs, may support a diagnosis of AD, false-positive and -negative reactions have been recognized in cats.^{2,15} A subset of atopic dogs and humans, sometimes referred to as intrinsic atopics, are recognized to produce low levels of allergen-specific IgE, potentially reducing the role of IgE antibodies and environmental allergens in disease pathogenesis within this group.^{2,8} Only limited evaluation of feline AD patients meeting strict diagnostic criteria, not reliant on allergen testing results, has so far been reported to assess potential feline AD subsets. There are suggestions that most cats with AD have weak reactions on IDT that make evaluation difficult, although in contrast, there are also reports of false positives in normal cats.^{2,16} In the present study, 68% of cats with confirmed AD that underwent allergen testing ($n = 19$) had strong positive reactions on IDT. Pollen and insect allergens were the most prevalent strong reactions, in contrast to previous studies on feline AD, in which house dust mites were more frequently implicated.⁶ Of note, irritant threshold concentrations for insect allergens, including flea, housefly, mosquito and moth, have recently been re-evaluated for IDT in cats, and current recommendations are for lower testing concentrations than those used during the study period.¹⁶ However, less than one-third of the cats had strong positive reactions to flea allergen on IDT in this cohort despite the study occurring in a flea endemic region. Similar to previous reports,¹⁵ multiple allergens were commonly positive in strongly reactive cats, although, in contrast to canine AD in the same region, pan-allergen-reactive cats were not recognized and most cats only reacted strongly to eight or fewer allergens.

Like canine AD,² feline AD has been reported as typically GC responsive.^{2,13} However, in the present study a good response to systemic GC therapy was reported in only 55% of cats, with partial response in another 22%, although the type, dosage and duration of GC therapies were not evaluated. In contrast, the response to antihistamines was better in this study than in previous reports in both cats¹⁷ and dogs¹⁵ with AD, with a good or partial response to antihistamines being reported in almost 70% of cats, although there was a good response in only two cats. Loratadine appeared to be the most effective antihistamine in this study. Although the response to ciclosporin therapy was reported as good in all 10 cats to which it was administered, the rate of serious adverse health events was of concern. A recent report on adverse reactions to ciclosporin in cats mainly documents gastrointestinal adverse effects,¹⁸ although individual case reports describe the occurrence of fulminant, potentially fatal toxoplasmosis.^{19,20} Notably, one report describes disease in two cats from the same region as the present

study population.¹⁹ An increased risk of toxoplasmosis was not recognized in the initial years of this study, and precautionary screening and preventative recommendations when starting ciclosporin therapy were not initially recommended. In addition, a registered feline formulation of ciclosporin with associated precautionary recommendations was not available during the study period. Geographical differences in disease prevalence, pet lifestyle and diet preferences may be important to the relative risks of toxoplasmosis during ciclosporin therapy. Recommendations for pretreatment measurement of toxoplasma titre and feline immunodeficiency virus/feline leukaemia virus screening, together with advice on the minimization of ongoing potential exposure to toxoplasma, are now standard in the study region prior to commencement of ciclosporin therapy for feline AD.

Allergen-specific immunotherapy is a recognized treatment option for feline AD.² In the present study, 57% of the 26 cats undergoing allergen-specific immunotherapy reportedly had a perceived 'good' response to immunotherapy. This was a little lower than previously reported (60–78%) in a study of cats with AD, but with only short-term follow-up.^{3,21}

An important limitation to this study is its retrospective nature and the relatively small number of cats with confirmed AD. In relationship to treatment responses, additional limitations are the lack of treatment controls, blinding, defined protocols and objective measures of treatment response; all of these limitations make treatment evaluations anecdotal and unreliable. However, the findings do supplement the paucity of studies evaluating treatment of feline AD to date and potentially guide directions for further prospective, well-designed studies. Concerning the clinical descriptive data, the inclusion of cases with concurrent dermatoses may also be a study limitation, reducing the ability to evaluate the AD component of disease clearly. However, concurrent dermatoses were present in 34 of the 45 cats with confirmed AD in this study (76%) and, although this may influence presentations, it is likely to be representative of feline AD as seen in practice, albeit potentially biased towards more severe or poorly responsive referral cases. The difficulties of identifying concurrent hypersensitivities with feline AD and an overlap of clinical signs between the hypersensitivities are well recognized,⁵ and were evident as clinical challenges throughout this study.

In contrast to human and canine AD,^{2,13} secondary bacterial and/or yeast infections have historically been suggested to be rare in cats.² However, a recent study investigating feline SBP revealed that almost 50% of cases were associated with underlying AD,¹¹ correlating with the findings of the present study. To a lesser extent, some cats with AD in this study had secondary *Malassezia* dermatitis (7%), which has also been identified previously in a cohort of healthy cats with allergic dermatitis,²² despite earlier suggestions of internal disease associations in cats.²³ Of note, less than one-third of cats with AD complicated by SBP in the present study had a reported 'good' response to systemic antimicrobial therapy, and severe pruritus and persistent self-trauma were recognized as problematic for early case management in this group.

In conclusion, this study evaluates a cohort of cats with AD identified by strict diagnostic criteria, with exclusion of FBH, AFR or infectious differentials unless as concurrent diseases. A geographically high or increasing prevalence of feline AD is confirmed, despite likely exclusion of some cases as a result of inability to complete diagnostic trials required to meet inclusion criteria. Breed predispositions are supported for Abyssinian and mixed breed cats, and possibly, Devon rex cats. A spectrum of clinical presentations was recognized for feline AD rather than defined reaction patterns as previously suggested. In addition, a wider distribution of lesions was documented in comparison to previous reports, with combinations of ventral and dorsal trunk, limbs, medial thighs and/or feet commonly affected, with or without the head and neck. In contrast to anecdotal suggestions, strong reactions on IDT were common in the study cohort and occurred in 68% of cats tested.

References

- O'Dair HA, PJ M, Maskell I. An open prospective investigation into aetiology in a group of cats with suspected allergic skin disease. *Vet Dermatol* 1996; 7: 193–201.
- Marsella R. Hypersensitivity disorders. In: Miller WH, Griffin CE, Campbell KL, eds. *Muller and Kirk's Small Animal Dermatology*. 7th edition. St Louis, MO: Elsevier, 2013; 363–431.
- Roosje PJ, Dean GA, Willemse T, *et al.* Interleukin 4-producing CD4+ T cells in the skin of cats with allergic dermatitis. *Vet Pathol* 2002; 39: 228–233.
- Hobi S, Linek M, Marignac G, *et al.* Clinical characteristics and causes of pruritus in cats: a multicentre study on feline hypersensitivity-associated dermatoses. *Vet Dermatol* 2011; 22: 406–413.
- Diesel D, DeBoer D. Serum allergen-specific immunoglobulin E in atopic and healthy cats: comparison of a rapid screening immunoassay and complete-panel analysis. *Vet Dermatol* 2011; 22: 39–45.
- Prost C. Feline atopic dermatitis: clinical signs and diagnosis. *Eur J Comp Anim Pract* 2009; 19: 223–229.
- Moriello KA. Feline atopy in three littermates. *Vet Dermatol* 2001; 12: 177–181.
- DeBoer DJ, Hillier A. The ACVD task force on canine atopic dermatitis (XV): fundamental concepts in clinical diagnosis. *Vet Immunol Immunopathol* 2001; 81: 271–276.
- Chalmers SA, Medleau L, Rakich P. Atopic dermatitis in cats: review and case reports. *J Vet Allergy Clin Immunol* 1995; 3: 7–11.
- Favrot C, Steffan J, Seewald W, *et al.* Establishment of diagnostic criteria for feline nonflea-induced hypersensitivity dermatitis. *Vet Dermatol* 2012; 23: 45–50, e11.
- Yu HW, Vogelnest LJ. Feline superficial pyoderma: a retrospective study of 52 cases (2001–2011). *Vet Dermatol* 2012; 23: 448–e486.
- Scott DW, Paradis M. A survey of canine and feline skin disorders seen in a university practice small animal clinic, University of Montréal, Saint Hyacinthe, Québec (1087–1988). *Can Vet J* 1990; 31: 830–835.
- Zur G, Ihrke PJ, White SD, *et al.* Canine atopic dermatitis: a retrospective study of 266 cases examined at the University of California, Davis, 1992–1998. Part I. Clinical features and allergy testing results. *Vet Dermatol* 2002; 13: 89–102.
- Mueller RS. Diagnosis and management of feline atopy. *Aust Vet Pract* 1997; 27: 138–139.
- Halliwell RE. Efficacy of hyposensitization in feline allergic diseases based upon results of in vitro testing for allergen-specific immunoglobulin E. *J Am Anim Hosp Assoc* 1997; 33: 282–288.
- Austel M, Hensel P. Evaluation of three different histamine concentrations in intradermal skin testing of normal cats and attempted determination of 'irritant' threshold concentrations for 48 allergens. *Vet Dermatol* 2006; 17: 189–194.
- Griffin JS, Scott DW, Miller WH, *et al.* An open clinical trial on the efficacy of cetirizine hydrochloride in the management of allergic pruritus in cats. *Can Vet J* 2012; 53: 47–50.
- Heinrich NA, McKeever PJ, Eisenschenk MC. Adverse events in 50 cats with allergic dermatitis receiving ciclosporin. *Vet Dermatol* 2011; 22: 511–520.
- Barrs VR, Martin P, Beatty JA. Antemortem diagnosis and treatment of toxoplasmosis in two cats on cyclosporine. *Aust Vet J* 2006; 84: 30–35.
- Last RD, Suzuki Y, Manning T, *et al.* A case of fatal systemic toxoplasmosis in a cat being treated with cyclosporine A for feline atopy. *Vet Dermatol* 2004; 15: 194–198.
- Trimmer AM, Griffin CE, Rosenkrantz WS. Feline immunotherapy. *Clin Tech Small Anim Pract* 2006; 21: 157–161.
- Ordeix L, Galeotti F, Scarpella F, *et al.* *Malassezia* spp. overgrowth in allergic cats. *Vet Dermatol* 2007; 18: 316–323.
- Maudlin EA, Morris DO, Goldschmidt MH. Retrospective study: the presence of *Malassezia* in feline skin biopsies. A clinicopathological study. *Vet Dermatol* 2002; 13: 7–13.

Supporting Information

Additional Supporting Information may be found in the online version of this article.

Table S1. Breed and sex distribution of 45 cases of feline atopic dermatitis presenting to a dermatology referral service, the base feline dermatology referral population ($n = 359$) and the total feline hospital population ($n = 12,265$) over the same 11 year period.

Résumé

Contexte – La dermatite atopique (AD) est reconnue comme une cause fréquente de prurit chez le chat mais ne reste que partiellement caractérisée.

Hypothèses/Objectifs – Le but de cette étude était d'évaluer les cas de dermatite atopique féline avérés.

Sujets – Quarante-cinq chats d'un service de référent en dermatologie (2001–2012).

Méthodes – Une revue rétrospective de données cliniques a été réalisée à l'aide de critères diagnostiques stricts comme l'exclusion de l'hypersensibilité aux piqûres de puces et l'hypersensibilité alimentaire.

Résultats – La prévalence de la maladie était de 12.5%, avec les chats domestiques croisés ($n = 24$), Abyssins ($n = 6$) et Devon rex ($n = 3$) prédisposés. L'âge moyen d'apparition de la maladie était de 2 ans (62% <3 ans; 22% >7 ans; écart de 3 mois à 12 ans). Les présentations fréquentes étaient sévères (82%), non-saisonnières (82%), récidivantes (36%) prurigineuses, avec alopecie/croûtes/excoriations et/ou érosions/ulcères (73%). On observait des lésions de dermatite miliaire (20%) et du complexe granulome éosinophilique (27%). La face/tête (71%), l'abdomen ventral (51%), le cou (51%), les membres (38%), les

pavillons (31%), dos/lombes (31%) et les pieds (16%) étaient les sites les plus fréquemment atteints; les lésions étaient restreintes à la tête et au cou dans seulement cinq cas (11%). On observait concurremment une otite externe (16%), une pyodermite bactérienne superficielle (49%), une dermatite à *Malassezia* (7%), une hypersensibilité aux piqures de puces (24%) et une hypersensibilité alimentaire (13%). De fortes réactions aux tests intradermiques étaient fréquentes (68%; 19 sur 30), le plus souvent aux pollens (61%) et/ou aux insectes (46%). Une bonne réponse à la ciclosporine (100%; 10 sur 10), aux glucocorticoïdes systémiques (55%; 22 sur 40) et à la désensibilisation spécifique d'allergènes (57%; 13 sur 23) et une réponse partielle à bonne aux antihistaminiques (67%; 22 sur 33) ont été rapportées.

Conclusions et importance clinique – La prévalence de la dermatite atopique féline étaient plus élevée que précédemment rapporté et les prédispositions raciales ont été confirmées. Un prurit sévère non-saisonnier était le plus fréquent avec un spectre varié de lésions affectant de nombreuses zones corporelles.

Resumen

Introducción – la dermatitis atópica (AD) es reconocida como una causa común de prurito en gatos, pero aun no está bien caracterizada.

Hipótesis/Objetivos – el propósito de este estudio fue evaluar casos de AD felina confirmados.

Animales – cuarenta y cinco gatos de una practica especializada en Dermatología (2001–2012).

Métodos – una revisión retrospectiva de historiales clínicos fue llevada a cabo siguiendo criterios estrictos de diagnóstico, incluyendo exclusión de hipersensibilidad a las pulgas y reacción adversa a alimentos.

Resultados – la prevalencia de la enfermedad fue de 12.5%, con predisposición en razas doméstica mestiza ($n = 24$), Abisinio ($n = 6$) y Devon Rex ($n = 3$). La edad media de aparición fue de 2 años (62% <3 años; 22% >7 años; rango 3 meses a 12 años). Las presentaciones mas comunes fueron prurito (82%), no estacional (82%), con remisión espontánea y recidiva (36%), con alopecia, costras/excoriaciones y/o erosiones/ulceras (73%). Dermatitis miliar (20%) y lesiones del complejo de granuloma eosinofílico (27%) también ocurrieron. La cara/cabeza (71%), abdomen ventral (51%), cuello (51%), extremidades (38%), orejas (31%), dorso/zona lumbar (31%) y pies (16%) fueron las zonas afectadas con mayor frecuencia; las lesiones estaban restringidas a cabeza/cuello en sólo cinco gatos (11%). Otitis externa concurrente (16%), pioderma superficial bacteriana (49%), dermatitis por *Malassezia* (7%), hipersensibilidad a las pulgas (24%) y reacciones alimentarias adversas (13%) también ocurrieron. Fue común observar reacciones intradérmicas intensas (68%; 19 de 30), con mayor frecuencia a polen (61%) y/o insectos (46%). Hubo buena respuesta a ciclosporina (100%; 10 de 10), glucocorticoides sistémicos (55%; 22 de 40) e inmunoterapia específica de alérgeno (57%; 13 de 23) y buena/parcial respuesta a antihistamínicos (67%; 22 de 33).

Conclusiones e importancia clínica – la prevalencia de AD felina fue mayor de lo previamente sugerido y se confirmó la predisposición de razas. Fue más común prurito severo no ligado a estaciones con un variado espectro de lesiones afectaron muchas áreas corporales.

Zusammenfassung

Hintergrund – Die atopische Dermatitis (AD) ist eine häufige Ursache für Juckreiz bei der Katze, ist aber noch unvollständig beschrieben.

Hypothese/Ziele – Das Ziel dieser Studie war eine Evaluierung von bestätigten AD Fällen bei Katzen.

Tiere – Fünfundvierzig Katzen aus einer dermatologischen Überweisungspraxis (2001–2012).

Methoden – Es wurde eine retrospektive Review von Fällen mittels strikter Diagnosekriterien durchgeführt; eine Hypersensibilität auf Flohbiss sowie Futtermittel wurde ausgeschlossen.

Ergebnisse – Die Prävalenz der Erkrankung betrug 12.5%, wobei gemischte Hauskatzen ($n = 24$), Abyssinier ($n = 6$) und Devon Rex Katzen ($n = 3$) prädisponiert waren. Das mediane Alter bei Beginn der Erkrankung lag bei 2 Jahren (62% <3 Jahre; 22% >7 Jahre; Bereich von 3 Monaten bis zu 12 Jahren). Häufige Präsentationen waren schwere (82%), nichtsaisonale (82%), intermittierender Juckreiz (36%), mit Alopie/Krustenbildung/Exkoriationen und/oder Erosionen/Ulzerationen (73%). Miliare Dermatitis (20%) und Läsionen des eosinophilen Granulomkomplexes (27%) traten auf. Gesicht/Kopf (71%), ventrales Abdomen (51%), Hals (51%), Extremitäten (38%), Pinnae (31%), dorsaler Rücken/Rumpf (31%) und Füße (16%) waren häufig betroffene Körperstellen; die Veränderungen waren nur bei fünf Katzen (11%) auf die Kopf/Halsgegend limitiert. Eine gleichzeitige Otitis externa (16%), superfizielle Pyodermie (49%), Malasseziendermatitis (7%), Flohbisshypersensibilität (24%) und adverse Futterreaktionen (13%) traten auf. Deutliche Reaktionen beim Intradermaltest waren häufig (68%; 19 bis 30), am häufigsten war eine Reaktion auf Pollen (61%) und/oder Insekten (46%). Eine deutliche Verbesserung durch Ciclosporinbehandlung (100%; 10 von 10); systemische Glukokortikoide (55%; 22 von 40) und allergen-spezifische Immuntherapie (57%; 13 von 23) und gute/partielle Verbesserung durch die Therapie mit Antihistaminen (67%; 22 von 33) wurde beschrieben.

Schlussfolgerungen und klinische Bedeutung – Die Prävalenz der feline AD war höher als ursprünglich angenommen und Rasseprädispositionen wurden bestätigt. Am häufigsten trat hochgradiger nichtsaisonal-er Juckreiz mit einer Variation an Veränderungen, die eine Reihe von Körperstellen betraf, auf.

要約

背景 – アトピー性皮膚炎はネコにおける痒みの一般的な原因として認識されているが、その特徴は完全には把握されていない。

仮説/目的 – この研究の目的はネコのADと確認された症例を評価することである。

供与動物 – 紹介病院皮膚科に来院した45頭のネコ(2001-2012)

方法 – 回顧的な症例記録の再調査を、ノミ刺咬性過敏症および食物有害反応の除外を含む厳密な診断基準を用いて行った。

結果 – 罹患率は12.5%で、雑種猫($n = 24$)、アビシニアン($n = 6$)、デボンレックス($n = 3$)らの品種に好発していた。発症平均年齢は2歳(62%<3歳、22%>7歳、3ヶ月から12歳の範囲)であった。一般的な症状は重症(82%)、非季節性(82%)、悪化/良化を繰り返すそう痒(36%)、脱毛/痂皮/表皮剥離および/あるいは糜爛/潰瘍の併発(73%)であった。粟粒性皮膚炎(20%)および好酸球性肉芽腫群(27%)が生じていた。顔面/頭部(71%)、腹部腹側(51%)、頸部(51%)、四肢(38%)、耳介(31%)、背部/臀部(31%)ならびに四肢端(16%)が頻繁に罹患する部位であり、病変は5頭のネコのみで頭部/頸部に限局していた(11%)。再発性の外耳炎(16%)、表在性膿皮症(49%)、マラセチア皮膚炎(7%)、ノミ刺咬性過敏症(24%)、および食物有害反応(13%)が生じていた。皮内アレルギー試験における強い反応性は一般的(68%、30頭中19頭)であり、花粉(61%)および/あるいは昆虫(46%)に対する反応が最も頻繁にみられた。シクロスポリン(100%、10頭中10頭)、全身的なグルココルチコイド(55%、40頭中22頭)およびアレルギー得意的免疫療法(57%、23頭中13頭)で、良好な反応はが見られ、抗ヒスタミン剤(67%、33頭中22頭)で良好/部分的な反応が報告された。

結論および臨床的な重要性 – ネコADの有病率は以前に示唆されていたものよりも高く、好発品種が確認された。重症で非季節性そう痒は最も一般的で、罹患した病変部位の範囲は様々であった。

摘要

背景 – 异位性皮膚炎(AD)は猫の痒痒症常見原因、但是发病特点不明显。

假设/目的 – 本次研究的目的是评估已确诊的猫异位性皮膚炎病例。

动物 – 45只来自皮肤病转诊医院的猫。

方法 – 回顾那些经过严格诊断标准的病例,包括排除跳蚤叮咬过敏和食物过敏。

结果 – 疾病发病率是12.5%,混血土猫($n = 24$)、阿比西尼亚猫($n = 6$)、德文卷毛猫($n = 3$)这三个品种有易感性。首次发病年龄中值是2岁(62%<3岁;22%>7岁;平均为3个月到12岁)。通常表现为严重(82%)、非季节性(82%)、时好时坏的痒痒(36%),伴有脱毛/结痂/抓痕和/或糜烂/溃疡(73%)。粟粒性皮膚炎占20%、嗜酸性肉芽肿复合病变占27%。常发部位为面部(71%)、下腹部(51%)、颈部(51%)、四肢(38%)、耳廓(31%)、背部/尾部(31%)、足部(16%),病变只限于面部的猫有五只(11%)。并发外耳炎(16%)、浅表脓皮病(49%)、马拉色菌性皮膚炎(7%)、跳蚤叮咬过敏(24%)和食物过敏(13%)。皮内过敏原试验有强烈反应的很常见(68%),最常见的过敏原为花粉(61%)和/或昆虫(46%)。据统计环孢素(100%;10/10)、全身性糖皮质激素(55%;22/40)、过敏原特异性免疫治疗(57%;13/23)有效,抗组胺药物有效/部分有效(67%;22/33)。

总结与临床意义 – 猫异位性皮膚炎的发病率高于先前的统计,并证明有品种易感性。严重的非季节性痒痒最常见,并伴有多样性的皮肤病变,发生在身体的多个部位。

Table 1. Breed and sex distribution of 45 cases of feline atopic dermatitis presenting to a dermatology referral service, the base feline dermatology referral population (n=359), and the total feline hospital population (n= 12265) over the same 11 year period.

Signalment	AD Cats [n (%)]	Referral cats [n (%)]	Total hospital cats [n (%)]	AD cat predilection within referral dermatology †	AD cat predilection within total hospital †
Breed					
Domestic*	24 (53)	209 (58)	8636 (70)	$P = 0.503$	$P = 0.012‡$
Abyssinian	6 (13)	24 (7)	138 (1)	$P = 0.056$	$P < 0.001‡$
Burmese	3 (7)	26 (7)	862 (7)	$P = 0.873$	$P = 0.924$
Devon rex	3 (7)	14 (4)	155 (1)	$P = 0.305$	$P = 0.019‡$
Ragdoll	2 (4)	11 (3)	249 (2)	$P = 0.566$	$P = 0.232$
Himalayan	1 (2)	7 (2)	177 (1)	$P = 1$	$P = 0.481$
Russian blue	1 (2)	7 (2)	206 (2)	$P = 1$	$P = 0.534$
Siamese cross	1 (2)	2 (0.6)	46 (0.4)	$P = 0.235$	$P = 0.156$
Manx	1 (2)	2 (0.6)	31 (0.3)	$P = 0.235$	$P = 0.108$
Oriental shorthair	1 (2)	3 (0.8)	72 (0.6)	$P = 0.332$	$P = 0.233$
Persian	1 (2)	10 (3)	333 (3)	$P = 1$	$P = 0.839$
Maine coon	1 (2)	2 (0.6)	51 (0.4)	$P = 0.235$	$P = 0.171$
Sex					
Female	27 (60)	194 (54)	6103 (50)	$P = 0.391$	$P = 0.169$
Male	18 (40)	165 (46)	6162 (50)		
Neuter status§					
Neutered	45 (100)	317 (88)	9636 (79)	$P = 0.009$	$P < 0.001$
Entire	0 (0)	42 (22)	2629 (21)		

*Domestic short-haired (DSH), domestic medium-haired (DMH), and domestic long-haired (DLH) crossbreeds combined

†Pure breed comparisons using Fisher's exact test; Domestic mixed breed and neuter comparisons using Pearson's chi-squared test

‡Statistically significant difference ($P < 0.05$)

§ Neuter status of all cats was determined at the time of data collection only, and does not necessarily represent neuter status at time of developing AD or neuter status at the first hospital visit for the base hospital population.