RESEARCH ARTICLE

Assessment of Pruritus in Feline Dermatological Affections using Trichogram and Predesigned Scoring Systems - A Preliminary Study

Varsha Mary Mathai*, Sherin B. Sarangom, Roshna K., Anjana P.

Abstract

The study was undertaken to identify the common dermatological conditions of cats, to evaluate their clinical status and to study pruritus using predesigned scoring system and trichogram. A total of 250 client owned cats were selected randomly irrespective of the presence or absence of apparent pruritus or skin lesions. Of these, 129 (51.6%) cats were diagnosed as dermatological case. Out of 129 cases, 52 (40.31%) were positive for *Lynxacarus radovskyi*, 37 (28.68%) *Otodectes cynotis*, 15 (11.63%) *Ctenocephalides felis*, 8 (6.20%) *Felicola subrostratus*, 4 (3.10%) *Sarcoptes* sp., 9 (6.98%) *Malassezia* sp., 3 (2.33%) pyoderma and 1 (0.77%) *Demodex gatoi*. Pruritus was the most observable and earliest clinical sign in most of the dermatological conditions. In each of the 129 cases, pruritus was retrospectively graded using a predesigned 5-point numerical scale and trichogram analysis. Out of 129 cats positive for various skin conditions, mostly due to ectoparasites, 23 (17.83 %) cats had pruritus score zero. In 96.1% (124/129) cats with various condition, trichogram analysis of 100 hair tips in each case revealed moderate (50-70%) to large (>70%) proportions of blunt or frayed hair tips. Out of 23 cats with pruritus score zero, 18 cats had moderate proportions (50-70%) of damaged hair tips on trichogram. The existence of feline population infested with ectoparasites that showed subtle signs or no signs of pruritus may evade veterinary intervention through under-diagnosis and further spread the vector borne diseases to other animals and humans.

Key words: Dermatological, Feline, Pruritus, Trichogram.

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Introduction

Dermatological conditions of infectious or parasitic etiology are a common cause of pruritus, self-induced alopecia, anaemia and vector borne diseases in cats and zoonotic concerns in humans. Most of the skin infections or parasites can easily be diagnosed by microscopic examination, in spite of which there remain a problem in controlling them. This could be due to failure of treatment protocols in multi-cat households or association of domestic cats with feral cats (Salant *et al.,* 2014). But keeping apart the familiar causes like treatment failures and fast spread of parasites or other infectious agents, the gravity of under-presentation and under-diagnosis of feline ectoparasitic or infectious conditions as a potential cause for high prevalence of these conditions need to be investigated. Most of the infectious or parasitic skin conditions are marked by pruritus. Pruritus is usually the most visible sign of a dermatological issue that may lead to the presentation of pets to veterinary care. But considering the secret grooming behaviour of felines, the study was focused to examine the magnitude of pruritus in different feline dermatological conditions by a predesigned pruritus scoring system and trichogram analysis.

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Materials and Methods

A total of 250 client owned cat presented to District Veterinary Centre, Department of Animal Husbandry, Kannur, Kerala, India from January to December 2023 for skin lesions, routine check-up, deworming and vaccination were examined using laboratory techniques.

Selection and Exclusion Criteria: Skin samples were collected from cats presented with skin lesions and also from cats brought for deworming, vaccination etc. irrespective of the presence or absence of pruritus and apparent skin lesions. Cats presented with severe systemic illness or other emergencies were excluded. The common dermatological

conditions of infectious or ectoparasitic etiology affecting cats and their clinical presentations were studied.

Dermatological Sample Collection: Samples such as skin scraping, impression smear, coat brushing, ear swabs and trichogram were collected from 250 cats of all age groups and of either sex.

Grading of Pruritus: In this study, pruritus in every cat diagnosed with dermatological condition (n=129) was graded retrospectively by the clinician using a five point numerical scale (investigator pruritus score) proposed by Steffan *et al*. (2012). Pruritus for each condition was retrospectively assessed through a predefined scoring system, concomitantly evaluated using trichogram analysis.

Trichogram Analysis: All the cases diagnosed with dermatological conditions including ectoparasites, malassezia, dermatitis and pyoderma (n=129) were subjected to trichogram analysis. A total of one hundred epilated hairs were examined under a microscope at 10X magnification to assess the integrity of hair tips, aiming to examine pruritus-induced hair tip damage in cats.

Results and Discussion

Out of 250 cats examined, a total of 129 (51.6%) cats were diagnosed with dermatological affections, most common of which were ectoparasitic infestations. The cat fur mite, *Lynxacarus radovskyi* was observed in 52 (40.31%) cases, *Otodectes cynotis* in 37 (28.68%) cases, *Ctenocephalides felis* in 15 (11.63%) cases, *Felicola subrostratus* in 8 (6.20%) cases, *Sarcoptes* sp., in 4 (3.10%) cases and *Demodex gatoi* in 1 (0.77%) case. Other conditions observed were feline malassezia noticed in 9 (6.98%) cats and pyoderma in 3 (2.33%) cats. The most prevalent ectoparasite in the selected geographical area was *L. radovskyi*. However, the studies conducted by Thomas *et al.* (2016) and Akucewich *et al.* (2002) in other parts of the world revealed the most common ectoparasite in cats to be *C. felis*. Thomas *et al.* (2016) reported 97.2% and Akucewich *et al.* (2002) reported 92.5% prevalence for *C. felis*. Out of 250 cats sampled in the present study, 117 (46.80%) were diagnosed with ectoparasites. In contrast, a higher ectoparasitic prevalence of 65% was reported in feral cats by Mendes-de-Almeida *et al.* (2011). This could be attributed to the routine veterinary care received by the domestic cats which considerably reduced the prevalence of ectoparasites in present sample population. The higher prevalence of ectoparasites among feral cats as recorded in other studies also assumed a heavy infestation of the environment, posing a high risk to the domestic cats and the humans associated with them.

All the cats diagnosed with skin conditions were graded retrospectively (Table 1) using a five point numerical scale (investigator pruritus score). All the cats with pyoderma, yeast infection, scabies and demodicosis showed characteristic lesions and severe pruritus with score 4. Severe pruritus was also reported by Moriello *et al.* (2013) in feline demodicosis, Schmeitzel (1988) in sarcoptic mange and Morris (1999) in malassezia dermatitis. Sarcoptic mange was presented as crusts, thickened skin of ear margins (Fig. 1a, 1b, 1c). Malassezia dermatitis was characterised by dark greasy kerato-sebaceous debris on ventral chest, limbs, inguinal region and ventral chin (Fig. 2a, 2b, 2c) which were very pruritic. Three cats were presented with pyoderma, all of which had large area of alopecia with erosions, excoriations and epidermal collarettes (Fig. 3a, 3b). Demodicosis caused by *D. gatoi* was observed in a kitten. It was characterised by severe seborrhoea, alopecia and crusting of the dorsum (Fig. 4a, 4b, 4c).

F. subrostratus is the only louse that affects cats (Fig. 5a, 5b). This louse is a species-specific, non-blood sucking parasite that is usually spread by direct contact between animals (Grant, 1989). Cats with louse infestation were presented with pruritus score 2 and score 3, dull hair coat, scaling, and hair fall. Among the cats affected with *L. radovskyi* (fur mite) and *O. cynotis* (ear mite), varying degrees of pruritus were observed. The most common observation in ear mite infestation was dark dry coffee ground otic debris. In some cases, secondary alopecia and excoriation of ear pinna was also evident due to severe pruritus (Fig. 6a, 6b). In case of lynxacarosis, different types of clinical presentations were observed ranging from no lesions at all to salt and pepper appearance with dull and dirty coat to generalised alopecia (Fig. 7a, 7b).

Eighteen cats infested with *L. radovskyi* and five cats infested with *O. cynotis* revealed neither an observable pruritus (pruritus score 0) nor characteristic lesions. All the 15 cats infested with *C. felis* (Fig. 8a, 8b) manifested moderate pruritus (score 2) on examination. From this study it was evident that pruritus which was a common sign of ectoparasites was variable in its degree from patient to patient and from one condition to other. This variation may be attributed to the characteristics of the parasite, the ectoparasitic load and to the hidden grooming behaviour of cats. What-so-ever may be the attributes, very low degree of pruritus and absence of lesions as observed in the present study in eighteen cats with *L. radovskyi* and five cats with *O. cynotis,* presented for general check-up and vaccination, may lead to under-diagnosis of ectoparasites and thereby inadequate treatment and control programmes among the domestic cats. Long term prevalence of ectoparasites may result in spread of other diseases in cats such as feline leukemia (Vobis *et al.,* 2003) and zoonotic conditions in humans population closely associated with the domestic cats such as cat-scratch fever, flea borne typhus, plague, tularemia (Foil *et al.,*1998; Gerhold and Jessup, 2013).

Trichogram was performed for all the cats diagnosed with dermatological affections (n=129). Irrespective of the dermatological condition, 124 out of 129 cases (96%) had evident signs of over-grooming in trichogram which was observed as moderate to high proportions of blunt or frayed hair tips (Fig. 9). Among them, 25 cats had 50-70 % and

99 cats had more than 70 % damaged hair tips on examination of 100 epilated hair tips from each case. Only five cats out of 129 cases (3 with *Lynxacarus radovskyi* and 2 with *Otodectes cynotis*) had only small proportions (<50%) of blunt or frayed hair tips on trichogram agreeing with the low pruritus score of zero observed in these animals. On comparing trichogram analysis with pruritus score in each case, the most prominent observation was that, out of the 23 cats with different skin conditions for which pruritus score was assigned zero, 18 cats (73.91 %) had moderate proportions (50-70 %) of broken, split hair tips in trichogram indicating over-grooming in these cats as well. This finding implies the existence of a small part of ectoparasite infested feline population with no signs or subtle signs which may go unnoticed by the owners/ clinicians, probably due to the secret grooming behaviour in cats. These findings validated the superiority of laboratory tests such as trichogram analysis over investigator pruritus score in identifying the presence of pruritus in feline patients. Further studies are warranted to grade pruritus based on trichogram analysis in cats.

Pruritus was a frequently observed clinical manifestation irrespective of the condition. The severity of pruritus was studied using predesigned scoring systems and trichogram analysis. All the cats with high pruritus score had large proportions of broken hair tips in trichogram irrespective of the condition. Also, 18 out of 23 cats with pruritus score zero had moderate proportion of damaged hair tips in trichogram which implied the absence of evident pruritus and lesions in a part of the ectoparasite infested study population.

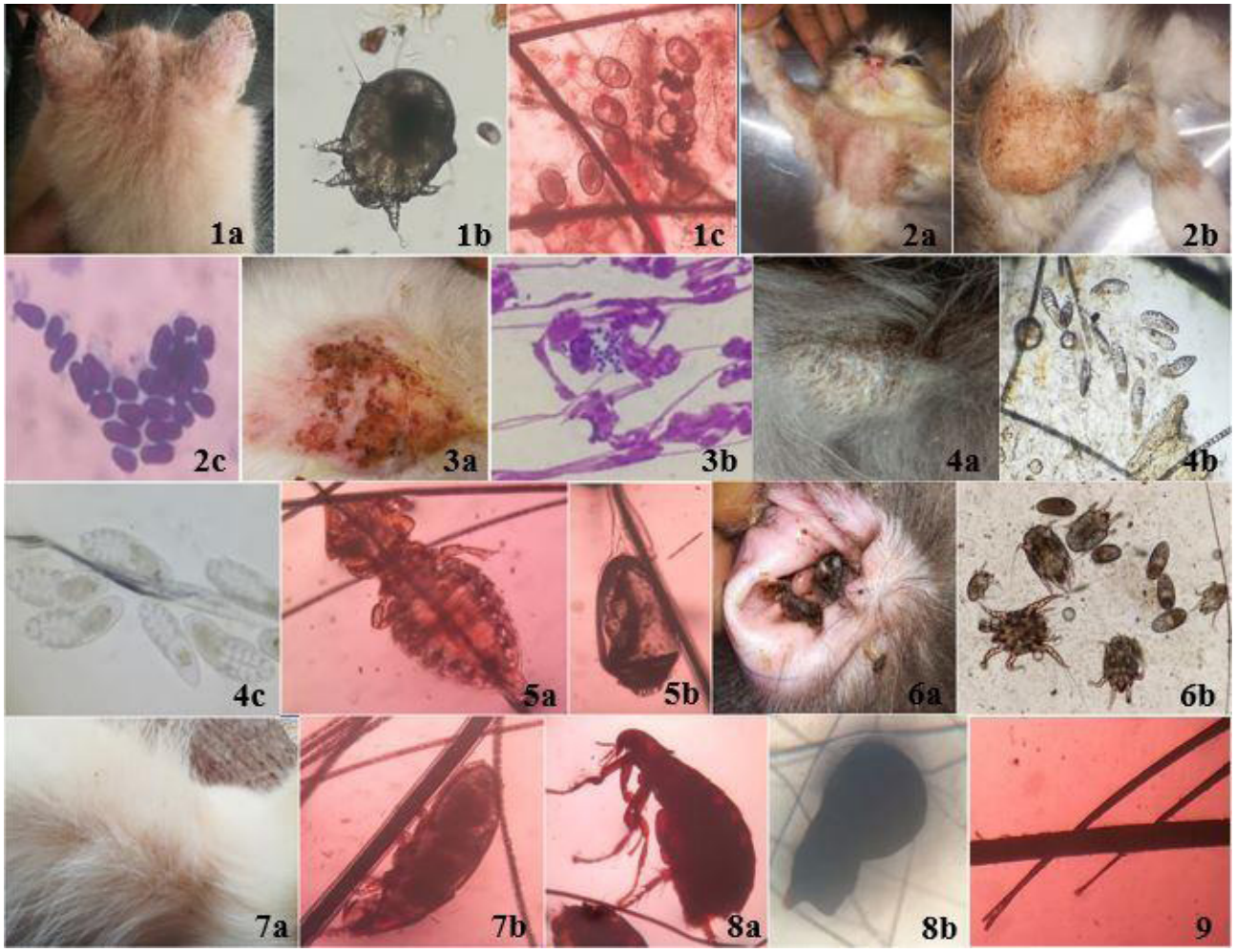

Fig. 1: Sarcoptic Mange: Thickened skin of ear margins with crusts in a two month old kitten (a), pictomicrographs of adult mites [40X] (b) and ova [10X] (c) of *Sarcoptes sp.* **Fig. 2:** Feline Malassezia dermatitis: Dark greasy kerato-sebaceous debris on ventral chest and thigh of a kitten (a, b). Giemsa stained impression smear [100X] revealed Malassezia sp. (c). **Fig. 3:** Pyoderma - alopecia with erosions and epidermal collarettes in a cat (a). Impression smear [Giemsa, 100X] demonstrated numerous neutrophils and intra-cytoplasmic cocci (b). **Fig. 4:** Feline demodicosis: alopecia and crusting on dorsum of a kitten (a), short and stubby *Demodex gatoi* mites under 10X (b) and 40X (c). **Fig. 5:** *Felicola subrostratus*: adult louse (a) and nits (b) in trichogram [10X]. **Fig. 6:** *Otodectes cynotis*: dark dry "coffee ground" otic debris (a) and adult mites and ova of *Otodectes cynotis* [10X] (b). **Fig. 7:** Lynxacarosis: Clinical presentation of cats infested with *L. radovskyi* - salt and pepper appearance of hair coat (a). Trichogram revealed adult mites of *L. radovskyi* [10X] (b). **Fig. 8:** *Ctenocephalides felis*: adult flea (a) and flea dirt (b) seen on coat brush examination [10X]. **Fig. 9:** Frayed hair tips on trichogram [10X].

Table 1: The pruritus score and trichogram analysis in cats with various ectoparasitic and infectious dermatological affections

Ectoparasitic/ infectious dermatological affections	Trichogram analysis (Percentage of damaged hair tips)	Pruritus score					Total
		0	1	2	3	4	
Lynxacaru radovskyi	<50%	3	-	-	-	-	3
	50-70%	15	1	-	-	-	16
	>70%	-	1	22		10	33
	Total	**18**	**2**	**22**	**-**	**10**	**52 (40.31%)**
Otodectes cynotis	<50%	2	-	-	-	-	2
	50-70%	3	-	2	-	-	5
	>70%	-	-	3	22	5	30
	Total	**5**	**-**	**5**	**22**	**5**	**37 (28.68%)**
Ctenocephalides felis	50-70%	-	-	3	-	-	3
	>70%	-	-	12	-	-	12
	Total	**-**	**-**	**15**	**-**	**-**	**15 (11.63%)**
Felicola subrostratus	50-70%	-	-	1	-	-	1
	>70%	-	-	2	5	-	7
	Total	**-**	**-**	**3**	**5**	**-**	**8 (6.20%)**
Sarcoptes sp.	50-70%	-	-	-	-	-	0
	>70%	-	-	-	-	4	4
	Total	**-**	**-**	**-**	**-**	**4**	**4 (3.10%)**
Malassezia sp.	50-70%	-	-	-	-	-	0
	>70%	-	-	-	-	9	9
	Total	**-**	**-**	**-**	**-**	**9**	**9 (6.98%)**
Pyoderma	50-70%	-	-	-	-	-	0
	>70%	-	-	-	-	3	3
	Total	**-**	**-**	**-**	**-**	**3**	**3 (2.33%)**
Demodex gatoi	50-70%	-	-	-	-	-	0
	>70%	-	-	-	-	1	1
	Total	**-**	**-**	**-**	**-**	**1**	**1 (0.77%)**
Grand Total		**23**	**2**	**45**	**27**	**32**	**129**

Conclusion

The pressent salient observations throw light on the existence of a group of cats carrying ectoparasites, in every population that escapes all parasitic control measures and remains as a reservoir of parasites and other infectious agents transmitted by such parasites. These observations also call for further studies on sensitivity of visual pruritus scoring systems in identifying low degree pruritus especially in felines which are secret groomers. Studies on trichogram based pruritus scoring systems in felines are warranted. Also regular screening of ectoparasites in felines must be considered as important as vaccination programmes as they are ubiquitous and reservoirs of numerous vector borne diseases affecting animals and humans.

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