EFFICACY OF A 12.5% PYRIPROLE SPOT-ON SOLUTION AGAINST NATURAL FLEA (CTENOCEPHALIDES FELIS) INFESTATIONS ON DOGS.

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ABSTRACT

The efficacy of a 12.5% pyriprole spot-on solution against natural flea infestations applied monthly to dogs on three occasions within 60 days was investigated in patients presented at veterinary clinics in Western Australia. Twelve dogs of various breeds, age, weight, and sex were considered in the study. Six were treated with a pyriprole spot-on solution and six treated with a fipronil/(S)-methoprene spot-on solution as positive controls. The number of fleas on each dog was counted 14 (±2) and 30 (±2) days after the first treatment, and 30 (±2) days after the second and third treatments. The geometric mean efficacy of the pyriprole spot-on solution ranged between 100% and 93.8%, and for the fipronil/(S)-methoprene solution between 98.8% and 44.7%. The treatments were well tolerated by the animals.

INTRODUCTION

Fleas are a major nuisance pest and the most important ectoparasite infesting dogs and their environment all around the world.[1] Flea allergic dermatitis is a common dermatological condition in dogs and fleas can transmit a number of pathogenic micro-organisms and parasites.[2,3]

Pyriprole is a new representative of the phenylpyrazole derivatives with confirmed broad-spectrum activity against induced flea[4] and tick[4,5] infestations on dogs. The present investigation was conducted to confirm the efficacy of a 12.5 % spot-on solution against natural infestations on dogs presented as patients at two veterinary clinics in Perth, Western Australia and to determine the level of control when administered in monthly intervals on three occasions within a 60-day period.

MATERIALS AND METHODS

Thirteen dogs of different breeds (Kelpie, Maltese x Shitzu, Pinscher, Kelpie x Labrador, German Shepherd, cross-bred), mixed-

sex (six spayed females, one in tact female, five neutered males, and one in tact male), 2 to 14 years old, >2 kg in weight (range at the first treatment 5.4 to 37.2 kg), and from two veterinary practices were involved in this controlled study. Only healthy dogs with evidence of flea infestation (at least two live fleas seen after thumb count) and that had not been treated with a flea control product during the previous 2 months (6 months for lufenuron injectable) were included in the study. One dog from group 1 was later excluded because an infestation was never detected. This dog was initially included because an infested animal present in the same household was enrolled. Dogs from households that had received an environmental treatment within 1 month prior to study initiation were excluded from the study. Only dogs from households with a maximum of three pets (dogs or cats) were admitted, and all animals had to be treated. All dog owners were individually informed on the purpose and procedure of the study and gave their informed consent for their pet's participation.

The dogs were randomly assigned to two treatment groups. Group 1 was treated with Prac-Tic® spot-on solution containing 12.5% (w/v) pyriprole (Novartis), and Group 2 as a positive control to be treated with Frontline® Plus spot-on solution containing 10% (w/v) fipronil and 9% (w/v) (S)-methoprene (Merial). The dogs in both groups received three treatments on Study Days 0, 30 (±2) and 60 (±2) administered by the dog owners previously instructed and supervised by a veterinary nurse. The treatments were administered in the veterinary practice. The dogs in Group 1 were treated with a minimal dose of 12.5 mg pyriprole/kg body weight according to the following dose rates: 2 to 4.5 kg bodyweight received 0.45 ml of the pyriprole spot-on solution; 4.6 to 11.0 kg bodyweight received 1.1 ml; 11.1 to 22.0 kg received 2.2 ml; and 22.1 to 50 kg received 5.0 ml. The dogs in Group 2 were treated according to the following dose rates: ≤10 kg bodyweight received 0.67 ml of the fipronil/(S)-methoprene spot-on solution; 10.1 to 20 kg received 1.34 ml; 20.1 to 40 kg received 2.68 ml; and 40.1 to 60 kg received 4.02 ml.

The product was administered by applying the entire content of the appropriate sized pre-filled pipettes to the back of the individual animals. Care was taken to avoid wetting the hair and applying the dose to an area where the animal could lick it off. Concurrent treatments unlikely to interfere with the running or interpretation of the study (eg, routine vaccinations, steroids, and antibiotics) were acceptable and the treatment details were recorded. Heartworm medications were not to be used if they had a concurrent indication for flea control. All other treatments had to be used only to avoid unnecessary suffering of the animals and needed to be justified.

Flea counts were carried out by a technician on Study Days 0, 30 (±2), 60 (±2) prior to the corresponding scheduled treatment, as well as on Study days 14 (±2) and 90 (±2). Hand counting of live viable fleas was conducted according to an Australian regulatory guideline for small animal ectoparasiticide efficacy submission,[6] but instead of using the recommended scoring system, the actual number of fleas was recorded. The veterinary nurse performing the flea counting was blinded, and was not the person who supervised the administration of the product by the dog owner.

Efficacy for each dog at each time point was calculated according to the following formula: % efficacy = 100 x (FCB-FCT)/FCB, where FCB was the viable baseline flea count before the first treatment and FCT the flea count at time T after the first treatment. Arithmetic (A) and geometric (G) means, median, minimum, and maximum for efficacy percentages were calculated. For each study day, the statistical significance (p-value) of the difference between the groups was determined by the Man-Whitney U-test (two tailed).

Each animal was submitted to a full clinical examination on Study days 0, 14 (±2), 30 (±2), 60 (±2), and 90 (±2) and any adverse events had to be recorded.

Table 1. Number of fleas collected on dogs treated with a pyriprole or a fipronil/(S)-methoprene spot-on solution.

Group 1 (pyriprole)	Study Day				
Animal No.	0*	14	30	60	90
1	5	0	0	0	0
2	6	0	0	0	0
3	2	0	0	0	0
4	6	0	0	0	0
5	22	0	7	3	4
6	4	0	0	0	0
Group 2 (fipronil/methoprene)	**Study Day**				
Animal No.	0*	14	30	60	90
1	4	0	0	0	0
2	4	0	0	0	0
3	14	1	3	2	0
4	8	0	0	2	10
5	12	0	0	0	0
6	23	0	2	7	3

* Before the first treatment

Table 2. Mean arithmetic (A) and geometric (G) efficacy and summary statistics for dogs treated with a pyriprole or a fipronil/(S)-methoprene spot-on solution (SD = standard deviation; CV = coefficient of variation; Max = maximum; Min = minimum)

Study Day	Group*	Mean (A)	Mean (G)	SD (±)	CV(%)	Median	Max	Min	p-value
14	1	100.0	100.0	0.0	0.0	100.0	100.0	100.0	0.4047
	2	98.8	98.8	2.9	3.0	100.0	100.0	92.9	
30	1	94.7	93.8	13.0	13.7	100.0	100.0	68.2	0.7526
	2	95.0	94.6	8.8	9.2	100.0	100.0	79.0	
60	1	97.7	97.6	5.6	5.7	100.0	100.0	86.0	0.1823
	2	88.4	87.5	13.7	15.6	92.9	100.0	70.0	
90	1	97.0	96.7	7.4	7.7	100.0	100.0	82.0	0.5993
	2	81.2	44.7	40.1	49.4	100.0	100.0	0.0	

* Group 1 treated with pyriprole; Group 2 treated with fipronil/methoprene

RESULTS AND DISCUSSION

Table 1 shows the number of fleas that were recorded for each individual dog throughout the whole study, and Table 2 displays the mean efficacy achieved and the summary statistics for both treatment groups. Figure 1 shows the percent efficacy based on the mean flea counts (G). Throughout the 90 days of the study, mean percentage efficacy ranged between 100-94.6% (A) and 100-93.8% (G) for pyriprole-treated dogs and between 98.8-81.2% (A) and 98.8-44.7% (G) for fipronil/(S)-methoprene-treated dogs (Table 2). After the first treatment no single viable flea was recorded in five out of six dogs treated with pyriprole and in three out of six dogs treated with fipronil/(S)-methoprene. The cumulative number of live viable fleas collected in all animals during the 90-day study period was 14 for the pyriprole-treated dogs (45 fleas before the first treatment), and 30 for the fipronil/(S)-methoprene-treated dogs (65 fleas before the first treatment). However, the difference between the treatment groups was not statistically significant.

This level of control is comparable to the one reported for various commercial flea adulticides in similar studies against natural flea infestations on dogs, eg, between 100% and 94.7% for an imidacloprid spot-on,7 between 98.8% and 89.4%7 or between 98.2% an 95.9%8 for a fipronil spot-on, between 99.1% and 92.5%9 and between 99.8% and 92.1%10 for a selamectin spot-on, and between 92.0% and 88.7% for a metaflumizone/amitraz spot-on8 (all G).

The relatively low number of animals that were finally involved in the trial was due to the lower than expected number of dog patients meeting the inclusion criteria. Nevertheless, this number is similar to the one found in studies against induced infestation.11-14 Consequently the efficacy data against natural flea infestations presented herein confirm the excellent flea control properties of the 12.5% pyriprole spot-on solution already reported against induced infestations.[4]

Treatment was well tolerated by all animals in both treatment groups, and no significant adverse drug reactions were recorded during the study.

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