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# Efficacy and safety of sarolaner against generalized demodicosis in dogs in European countries: a non-inferiority study

**Csilla Becskei*, Otto Cuppens* and Sean P. Mahabir†**

*Zoetis, Veterinary Medicine Research and Development, Mercuriusstraat 20, Zaventem, 1930, Belgium
†Zoetis, Veterinary Medicine Research and Development, 333 Portage St., Kalamazoo, MI 49007, USA

Correspondence: Csilla Becskei, Zoetis, Veterinary Medicine Research and Development, Mercuriusstraat 20, Zaventem 1930, Belgium. E-mail: csilla.becskei@zoetis.com

**Background –** Treatment of canine demodicosis can be challenging; new treatments are always being sought.

**Objective –** The efficacy of sarolaner was evaluated in comparison with a moxidectin/imidacloprid topical product against generalized demodicosis in dogs in a randomized, single-masked, multi-centre field study.

**Animals –** Client-owned dogs were treated monthly with oral sarolaner ($n$ = 53) or with weekly/monthly topical moxidectin/imidacloprid ($n$ = 28).

**Methods –** Mites were counted monthly in deep skin scrapings and the severity of skin lesions was evaluated. Dogs completed the study when no live mites were found on two consecutive monthly skin scrapings or on day 180 at the latest (study end).

**Results –** Parasitological cure, defined as the first time that no live mites were found in the skin scrapings, was achieved in 92.9% and 100% of the dogs after three and no more than five monthly treatments with sarolaner (respectively). In the moxidectin/imidacloprid group, 77.3% and 91.7% of the dogs were cured after three and six months, respectively. Parasitological cure rate for sarolaner was non-inferior to moxidectin/imidacloprid on day 60. Mite counts were reduced by 77.2%, 95.0%, 98.5%, 99.0%, 100% and 100% in the sarolaner group and by 68.0%, 88.4%, 91.1%, 92.7%, 73.9% and 82.2% in the moxidectin/imidacloprid group, on days 30, 60, 90, 120, 150 and 180, respectively, compared to pre-treatment counts. The skin lesions improved throughout the study; the total affected body surface decreased by 94% in the sarolaner and by 72% in the moxidectin/imidacloprid group. There were no treatment-related adverse events.

**Conclusions –** Monthly oral administration of sarolaner was safe and highly effective in the treatment of generalized demodicosis in dogs.

## Introduction

Demodex mites are considered a normal resident of the dog's skin.[1] Their replication in the skin may irritate the host, trigger cellular immigration and exudative skin inflammation in susceptible dogs that show the characteristic crust formation and alopecia of clinical demodicosis.[2] Depending on the extent of skin lesions, demodicosis is categorized into localized or generalized forms.[3] Although localized demodicosis usually resolves spontaneously without treatment, generalized demodicosis is a severe condition that has been difficult to control with traditional therapies.[3] The primary aim of miticidal therapy is to achieve resolution of clinical signs and absence of mites on multiple skin scrapings. According to clinical practice recommendations, treatment should be continued for at least 1 month after negative skin scrapings have been achieved.[2,3]

Authorized treatment options in different countries may include weekly or biweekly amitraz rinses, weekly to monthly application of moxidectin spot-on formulations in combination with imidacloprid, and daily oral (p.o.) administration of milbemycin oxime.[4–6] Additionally, a number of macrocyclic lactones used at off-label dosages and regimes have been shown to provide varying levels of effectiveness against *Demodex* mites, although often the high doses required can result in adverse reactions and drug interactions.[7–9] Some studies have reported good efficacy of isoxazolines administered p.o. in the treatment of demodicosis in dogs.[10–12] Besides their ease of administration, a further advantage of these systemic antiparasitic agents is the certainty of reaching all body areas, which has particular importance in long-haired animals.[2] Adverse events have not been reported for isoxazolines during the treatment of demodicosis in dogs.[10–12]

The efficacy of sarolaner (Simparica® Chewable Tablets, Zoetis; Parsippany, NJ, USA) against *Demodex* and *Otodectes* mites was reported in a previous study following monthly oral administration.[12] In this non-inferiority study, the efficacy and safety of sarolaner were investigated and compared to moxidectin/imidacloprid in dogs with generalized demodicosis under field conditions.

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## Methods

A randomized, single-masked, multi-centre clinical study with a positive control was conducted in France (11 sites), Hungary (six sites), Portugal (10 sites) and Italy (three sites). The study was conducted in compliance with Good Clinical Practice and was designed to gain regulatory approval for sarolaner for the treatment of demodicosis in dogs in Europe.[13] The study protocol was reviewed and approved by the Zoetis Ethics Review Assessment Team. Each dog was enrolled with the written informed consent of its owner.

All personnel conducting efficacy and safety evaluations were unaware of the treatment allocation. Study treatments were administered by a dedicated dispenser during the scheduled clinic visits, who was not involved in any other study activities. If weekly treatment with the control product was necessary, these were administered by the owner in the home environment between the scheduled clinic visits.

### Animals

Dogs with clinical signs of generalized demodicosis were eligible for inclusion if they showed skin lesions (such as alopecia, erythema, comedones, papules, pustules, casts, scales or crusts) involving an entire body region or five or more localized lesions (each with a diameter >2.5 cm), or pododemodicosis involving two or more feet, and had a total of at least four live *Demodex* mites (immature or adult) in five deep skin scrapings.[2,3] Dogs that were pregnant, lactating or intended for breeding, were receiving immunosuppressive therapy, systemic or topical antimicrobials, had been treated with an ectoparasiticide that had residual efficacy against *Demodex canis* at the time of enrolment, and had mange due to *Sarcoptes* mites were not enrolled. The minimum age for enrolment was 8 weeks. No concomitant treatment with an ectoparasiticide was allowed during the study.

If in any one household more than one dog was eligible for inclusion then the dog with the most severe clinical signs of generalised demodicosis was selected as the primary case. All other dogs in the same household were enrolled in the study as supplementary dogs if they showed signs of demodicosis and needed miticide treatment. Skin scrapings of the supplementary dogs were not required for the purposes of the study. Only primary dogs were included in the efficacy analysis and all dogs were included in the safety assessment.

### Treatment administration

Primary dogs were allocated in a ratio of 2:1 to one of two treatment groups to receive sarolaner or moxidectin/imidacloprid, respectively, in a randomized block design with one-way treatment structure replicated in multiple clinics. Supplementary dogs received the same treatment as the primary dog in the household.

Treatments were administered by the Dispenser on days 0 and 30, and if necessary on days 60, 90, 120 and 150. Day 0 was defined as the day when the enrolled animals were first treated with the study medication. Doses were calculated based upon body weight recorded before each monthly treatment administration.

Sarolaner (Simparica® Chewable Tablets, Zoetis) was administered p.o. according to the approved dosing table in the product labelling for use against fleas, ticks and scabies mites at 2–4 mg/kg. There were no restrictions regarding the time of dosing to the feeding time of the dogs. Moxidectin/imidacloprid (Advocate® Spot On Dog, Bayer; Leverkusen, Germany) was used as a positive control product and was administered topically following the approved label directions (to deliver at least 10 mg/kg body weight imidacloprid and 2.5 mg/kg body weight moxidectin) against demodicosis with a single dose every month for mild to moderate cases and once a week for severe cases. The severity of the demodicosis was evaluated by the study veterinarians at every monthly visit and they prescribed the dosing frequency of moxidectin/imidacloprid according to the severity grade.

### Efficacy evaluation

The number of live *Demodex* mites was determined in five deep skin scrapings from each primary dog on days 0, 30 and 60, and if applicable on days 90, 120, 150 and 180. At each occasion the same five sites were scraped for each dog as at enrolment on day 0. At enrolment on day 0, the five distinct sites that showed the most severe evidence of current mite infestation were selected for scraping. The veterinarians were advised to scrape areas with primary lesions, such as follicular papules and pustules, but not ulcerated areas because mite yield is often low there. A curette, spatula or scalpel blade was used to collect samples from an area approximately of 1 $cm^2$ at each scraping site. The skin was squeezed during or between scrapings to extrude mites from the deep follicles and the skin was scraped until capillary bleeding occurred. Scraped material was transferred to a slide, mixed with mineral oil and examined microscopically using 40× or 100× magnification to count adult and immature mites. The presence of *Demodex* eggs in skin scrapings also was recorded. Dogs were considered to be parasitologically cured when all skin scrapings were negative for the first time. All dogs in any household completed the study when no live mites were found on two consecutive monthly skin scrapings on the primary dog or on day 180 at the latest. Therefore, the earliest possible study completion was on day 60.

The severity of clinical signs was evaluated prior to treatment on day 0 and on days 14, 30, 60 and, if applicable, on days 90, 120, 150 and 180. An empirical four grade scale was used as follows: absent (no signs present); mild (intensity/density is low and only a small area of body is affected); moderate (great intensity/density over a small area or of lesser intensity/density but affecting a large area); and severe (great intensity/density and covering a large area). At each occasion the total body surface area affected by any of these clinical signs also was recorded.

### Safety

All dogs received a physical examination by a veterinarian at study inclusion and at each follow-up visit to evaluate for apparent adverse events. At each visit owners were asked about any abnormal heath observations between the visits.

### Data analysis

The individual dog was the experimental unit. Dogs that completed a visit more than five days out of window were not included in the analysis at that respective visit. Parasitological cure rate, defined as the percentage of dogs free of live mites, and the percentage reduction in the mite counts versus pre-treatment was calculated at each post-treatment visit and at study completion. Dogs were not included in the study completion summaries for parasitological cure if any of their last two visits was more than five days out of window (three dogs in the sarolaner group) or if they were removed from the study before they had two negative skin scrapings one month apart (four dogs in the moxidectin/imidacloprid group). StatXact software v10.0 (Cytel Inc.; Cambridge, MA, USA) was used to construct one-sided 97.5% exact lower confidence limit for the difference between parasitological cure rates for treatment groups to assess non-inferiority of sarolaner compared to moxidectin/imidacloprid at the 0.025 one-sided significance level on days 30 and 60. The percentage reduction in live mite counts on days 30 and 60 versus pre-treatment counts was analysed using a general linear mixed model for repeated measures, and non-inferiority of sarolaner compared to moxidectin/imidacloprid was assessed at the 0.025 one-sided significance level using SAS v9.4 (SAS Institute; Cary, NC, USA). The non-inferiority margin 15% was used.

The number of treatments administered to achieve parasitological cure in two sequential monthly skin scrapings was also calculated. Additionally, frequency distribution of skin lesion severity grades for each lesion type and the extent of skin lesions (expressed as percentage of total diseased body surface) were calculated at each visit.

## Results

### Treatment administration

Until study completion with parasitological cure the following number of moxidectin/imidacloprid treatments

 

were administered: two monthly treatments to four dogs, three monthly treatments to five dogs, nine treatments (one monthly and eight weekly) to four dogs, four monthly treatments to two dogs, seven treatments (three monthly and four weekly) to one dog, 10 treatments (two monthly and eight weekly) to three dogs, 17 treatments to one dog (one monthly and 16 weekly) and 24 weekly treatments to one dog. One dog completed the study without achieving parasitological cure after six monthly, and another dogs after one monthly and 21 weekly treatments. One additional dog that received two monthly treatments exited the study early by mistake when it had negative skin scrapings the first time and one additional dog died on day 43 following two monthly treatments. One dog was withdrawn due to lack of efficacy on day 150 following 20 weekly treatments and another dog was lost to follow-up after it received four monthly treatments. In the sarolaner-treated group, dogs received monthly oral treatments until study completion as shown in Table 1.

## Animals

In total, 53 primary dogs and ten supplementary dogs received sarolaner, and 28 primary and seven supplementary dogs received moxidectin/imidacloprid. In the sarolaner-treated group, all 53 enrolled dogs completed the study. In the moxidectin/imidacloprid group four primary dogs and one supplementary dog did not complete the study. In this group one primary dog was withdrawn due to lack of efficacy on day 146, one primary dog was found dead on day 43, one primary and one supplementary dog in the same household were lost to follow-up and one primary dog was removed from the study by mistake only after a single negative skin scraping.

At enrolment, dogs in the sarolaner group had a mean age of 2.5 years and a mean body weight of 16.4 kg; 55.6% were pure-bred, 44.4% were mixed breed; 63.5% were females and 36.5% were males. In the moxidectin/imidacloprid group, the mean age was 2.1 years, the mean body weight was 16.2 kg; 42.9% were pure-bred and 57.1% were mixed breeds; 60% were females and 40% were males.

At enrolment 39.6% ($n$ = 21) and 39.3% ($n$ = 11) of the primary dogs allocated to the sarolaner and the moxidectin/imidacloprid group, respectively, had severe generalized demodicosis.

## Efficacy

*Parasitological cure rates*

One dog at day 60, three dogs at day 90 and one dog at day 120 in the sarolaner group and one dog at day 60 in the moxidectin/imidacloprid group were not included in the efficacy summaries because their visits were more than five days out of window. Parasitological cure rates on days 30, 60, 90, 120, 150 and 180 and at study completion are summarized in Table 1 for both groups. The parasitological cure rate for sarolaner was non-inferior to moxidectin/imidacloprid on day 60, but failed to pass non-inferiority on day 30. There were no significant differences between cure rates for treatment groups on either day 30 or day 60 ($P$ = 0.7951 and 0.1818, respectively).

Overall at study completion, parasitological cure was achieved in all (100%) sarolaner-treated dogs and in 91.7% of the moxidectin/imidacloprid-treated dogs. Additionally one dog without parasitological cure in the moxidectin/imidacloprid-treated group was not included in these summaries because it was withdrawn due to lack of efficacy on day 146.

In the sarolaner-treated group, at most six monthly doses (180 days) were needed until two consecutive negative monthly skin scrapings in all dogs. In the moxidectin/imidacloprid group up to 24 weekly doses were applied until parasitological cure (168 days), whereas in one dog cure was not achieved after six monthly and in another dog after 22 (one monthly and 21 weekly) treatment administrations.

*Mite counts*

At enrolment, the arithmetic mean mite counts were 54.0 (range five to 500) and 62.7 (range four to 370) in the

**Table 1.** Arithmetic mean live *Demodex* mite counts, range of mite counts, percentage reduction in mite counts, proportion of mite-free dogs (parasitological cure rate) and proportion of dogs with *Demodex* eggs at each monthly visit and at study completion for dogs treated with monthly oral doses of sarolaner or receiving weekly/monthly topical applications of imidacloprid plus moxidectin

| | Study day | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 | 30 | 60 | 90 | 120 | 150 | 180 | Study completion |
| **Sarolaner** | | | | | | | | |
| Number of dogs evaluated for efficacy | 53 | 53 | 52 | 42 | 16 | 3 | 1 | 50 |
| Mean mite count | 54.0 | 9.0 | 1.7 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 |
| Range of mite counts | 5–500 | 0–73 | 0–15 | 0–4 | 0–1 | 0–0 | 0–0 | 0–0 |
| % reduction in mite counts | – | 77.2 | 95.0 | 98.5 | 99.0 | 100 | 100 | 100 |
| % mite-free dogs* | 0 | 15.1 | 69.2 | 92.9 | 93.8 | 100.0 | 100.0 | 100 |
| % of dogs with *Demodex* eggs | 69.8 | 26.4 | 7.7 | 2.4 | 0 | 0 | 0 | 0 |
| **Moxidectin/imidacloprid** | | | | | | | | |
| Number of dogs evaluated for efficacy | 28 | 28 | 26 | 22 | 11 | 5 | 3 | 24 |
| Mean mite count | 62.7 | 17.1 | 4.9 | 4.6 | 4.0 | 16.8 | 5.0 | 0.6 |
| Range of mite counts | 4–370 | 0–200 | 0–47 | 0–59 | 0–26 | 0–50 | 0–9 | 0–9 |
| % reduction in mite counts | – | 68.0 | 88.4 | 91.1 | 92.7 | 73.9 | 82.2 | 97.8 |
| % mite free dogs* | 0 | 17.9 | 53.8 | 77.3 | 63.6 | 40.0 | 33.3 | 91.7 |
| % of dogs with *Demodex* eggs | 67.9 | 35.7 | 19.2 | 18.2 | 27.3 | 60.0 | 33.3 | 4.2 |

*The percentage of dogs with no mites found in the skin scrapings on the day of evaluation (parasitological cure rate).

 

**Table 2.** Evaluation of the clinical signs of demodicosis for dogs treated with monthly oral doses of sarolaner or monthly/weekly topical applications of imidacloprid plus moxidectin

| | Sarolaner | | | | | | | | | Moxidectin/imidacloprid | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Study day | 0 | 14 | 30 | 60 | 90 | 120 | 150 | 180 | Study completion | 0 | 14 | 30 | 60 | 90 | 120 | 150 | 180 | Study completion |
| *n* | 53 | 53 | 53 | 50 | 40 | 16 | 3 | 1 | 48 | 28 | 28 | 28 | 25 | 20 | 8 | 2 | 2 | 22 |
| Body area affected (%) | 33 | 19 | 21 | 9 | 5 | 3 | 1 | 1 | 2 | 36 | 34 | 27 | 17 | 10 | 12 | 34 | 24 | 6 |
| Alopecia | 100 | 100 | 100 | 62 | 37.5 | 25 | 66.7 | 100 | 27.1 | 100 | 100 | 100 | 72 | 40 | 25 | 100 | 100 | 36.4 |
| Casts | 84.9 | 73.6 | 50.9 | 18 | 12.5 | 12.5 | 0 | 0 | 8.3 | 92.9 | 85.7 | 57.1 | 28 | 20 | 12.5 | 50 | 50 | 9.1 |
| Crusts | 73.6 | 62.3 | 39.6 | 14 | 15 | 18.7 | 0 | 0 | 4.2 | 85.7 | 82.1 | 39.3 | 24 | 20 | 25 | 100 | 50 | 9.1 |
| Comedones | 60.4 | 52.8 | 34 | 8 | 7.5 | 6.2 | 0 | 0 | 2.1 | 57.1 | 50 | 35.7 | 8 | 5 | 0 | 0 | 0 | 0 |
| Erythema | 92.5 | 77.4 | 62.3 | 26 | 17.5 | 12.5 | 0 | 0 | 6.2 | 92.9 | 78.6 | 60.7 | 40 | 15 | 25 | 100 | 50 | 13.6 |
| Papules | 62.3 | 45.3 | 34 | 12 | 10 | 18.7 | 0 | 0 | 6.2 | 64.3 | 50 | 35.7 | 16 | 0 | 12.5 | 50 | 50 | 9.1 |
| Pustules | 56.6 | 32.1 | 26.4 | 12 | 10 | 12.5 | 0 | 0 | 6.2 | 53.6 | 35.7 | 25 | 8 | 0 | 0 | 50 | 50 | 4.5 |

Number of dogs evaluated (*n*), mean percentage body area affected by lesions and the proportions of dogs with lesions at each visit and at study completion.

sarolaner and the moxidectin/imidacloprid groups, respectively. The percentage reduction in arithmetic mean mite counts on days 30, 60, 90, 120, 150, 180 and at study completion compared to pre-treatment counts are summarized in Table 1 for both groups. The percentage reduction in arithmetic mean mite counts for sarolaner was non-inferior to moxidectin/imidacloprid at both analysed time points, on days 30 and 60. *Demodex* eggs were not found in any sarolaner-treated dog beyond day 90, whereas eggs were found throughout the study in the moxidectin/imidacloprid-treated group (Table 1).

*Skin lesions*

Two sarolaner-treated and three moxidectin/imidacloprid-treated dogs received concurrent treatment with systemic antibiotics at various time points following enrolment that could have aided in the resolution of clinical signs of demodicosis. Their skin lesion scores recorded after the concurrent treatment were thus excluded from the assessment of clinical sign progression.

At enrolment most of the primary dogs showed alopecia, casts, crusts, comedones, erythema, papules and pustules (Table 2). Overall skin lesions were present on 33% (range 5–80%) and 36% (range 5–80%) of the whole body surface of the dogs in the sarolaner and in the moxidectin/imidacloprid group, respectively. Clinical signs of demodicosis improved throughout the study in both groups (Table 2). Overall the extent of body surface affected decreased by 94% and 72% in the sarolaner and in the moxidectin/imidacloprid group, respectively, by study completion.

### Health observations

After the first treatment administration, abnormal health events were reported in two sarolaner-treated and two moxidectin/imidacloprid-treated dogs. In the sarolaner-treated group, this involved one dog with bacterial folliculitis and another dog with bite wounds and body weight loss due to a feeding error by the owner.

In the moxidectin/imidacloprid group, one dog had concurrent flea allergy dermatitis and one dog (5-years-old, male, mixed breed dog) was found dead by the owner without showing any previous abnormality and the cause of death could not be established because the owner buried the animal without the possibility for postmortem examination. The latter dog did not have severe demodicosis and thus had received two monthly moxidectin/imidacloprid treatments before death.

## Discussion

The results from this non-inferiority field study indicate efficacy and apparent safety of sarolaner in the treatment of generalized demodicosis in dogs and support results reported previously under controlled conditions.[12] After three monthly treatments with sarolaner, parasitological cure was achieved in 92.9% of the cases and all dogs were free of mites at most after five monthly doses. In the moxidectin/imidacloprid-treated group, parasitological cure was not achieved in all dogs (91.7%) and one dog was withdrawn due to lack of efficacy. More than 50% of the dogs that received moxidectin/imidacloprid spot-on required seven to 24 treatment administrations before study completion.

The level of efficacy of sarolaner seems to be at least as good or better than for most other miticides. Parasitological cure was reported in 76–96% of dogs following milbemycin administration p.o. once or twice daily, in 0–86.7% of dogs following weekly to monthly moxidectin/imidacloprid spot-on treatment and in up to 100% of dogs during daily off-label use of ivermectin p.o.[4,6,14–16]

The rapid decrease in the mite numbers following monthly sarolaner administration was accompanied by a marked improvement in the skin lesions in the current study. Clinical signs were reported on average on 33% of the total body surface of the dogs at enrolment. After two monthly treatments the affected body area decreased to an average of 9% and by study completion to 2% in the sarolaner group. This improvement was presumed to be solely due to the miticide treatment because no concomitant treatments with any topical and systemic products were allowed during the study. This magnitude and speed of resolution of the clinical signs is difficult to compare with other treatments. A direct comparison is mostly hampered by the different methods used to evaluate the clinical response including a CADESI-like lesion scoring and the concomitant

 

treatments administered in previous studies (e.g. topical shampoos, systemic antibiotics).

There were no apparent adverse reactions to treatment with oral sarolaner. These results indicate that sarolaner is a well-tolerated and effective option for the treatment of generalized demodicosis in dogs. Additionally it is expected that with the reported high palatability in dogs and with the simple monthly dosing regimen, Simparica® Chewable Tablets will enhance compliance and help to reduce suboptimal efficacy results.[17,18]

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**Résumé**

**Contexte –** Le traitement de la démodécie canine peut etre un défi; de nouveaux traitements sont toujours plébiscités.

**Objectifs –** L'efficacité du sarolaner a été évaluée en comparaison avec un produit topique moxidectine/imidaclopride contre la démodécie généralisée du chien dans une étude multicentrique, randomisée, en simple aveugle.

**Sujets –** Les chiens de propriétaires ont été traités une fois par mois avec du sarolaner oral ($n = 53$) ou avec une application topique hebdomadaire/mensuelle de moxidectine/imidaclopride ($n = 28$).

**Méthodes –** Les acariens ont été dénombrés une fois par mois dans des raclages cutanés profonds et la sévérité des lésions cutanées a été évaluée. Les chiens complétaient l'étude quand aucun acarien vivant n' retrouvé au raclage deux mois consécutifs ou à jour 180 au plus tard (fin de l'étude).

**Résultats –** La guérison parasitaire, définit comme le moment ou aucun acarien vivant n'était retrouvé dans les raclages cutanés, a été atteinte pour 92.9% et 100% des chiens après trois et pas plus de cinq mois de traitement au sarolaner (respectivement). Dans le groupe moxidectine/imidaclopride, 77.3% et 91.7% des chiens ont été guéris après trois et six mois respectivement. La guérison parasitaire pour le sarolaner était non-inférieure à la moxidectine/imidaclopride à jour 60. Le comptage d'acariens a été réduit de 77.2%, 95.0%, 98.5%, 99.0%, 100% et 100% dans le groupe sarolaner et de 68.0%, 88.4%, 91.1%, 92.7%, 73.9% et 82.2% dans le groupe moxidectine/imidaclopride, à jours 30, 60, 90, 120, 150 et 180, respectivement comparé aux comptages prétraitements. Les lésions cutanées se dont améliorées au cours de l'étude; la surface corporelle totale atteinte a diminuée de 94% pour le sarolaner et de 72% pour le groupe moxidectine/imidaclopride. Aucun événement indésirable n'a été rapporté.

**Conclusions –** Une administration orale mensuelle de sarolaner est sure et hautement efficace dans le traitement de la démodécie généralisée chez le chien.

 

**RESUMEN**

**Introducción –** el tratamiento de la demodicosis canina puede ser dificultoso y constantemente se buscan nuevos tratamientos.

**Objetivo –** se evaluó la eficacia de sarolaner en comparación con un producto tópico de moxidectina/imidacloprid contra la demodicosis generalizada en perros en un estudio de campo al azar, simple enmascarado y multicéntrico.

**Animales –** perros de propietarios particulares fueron tratados mensualmente con sarolaner oral (n= 53) o con moxidectin/imidacloprid tópico semanal/mensual (n = 28).

**Métodos –** Los ácaros se contaron mensualmente en raspados profundos de la piel y se evaluó la gravedad de las lesiones cutáneas. Los perros completaron el estudio cuando no se encontraron ácaros vivos en dos raspados mensuales consecutivos de la piel o en el día 180 a más tardar (final del estudio).

**Resultados –** La cura parasitológica, definida como la primera vez que no se encontraron ácaros vivos en los raspados de la piel, se logró en 92,9% y 100% de los perros después de tres y no más de cinco tratamientos mensuales con sarolaner (respectivamente). En el grupo moxidectin/imidacloprid, el 77,3% y 91,7% de los perros fueron curados después de tres y seis meses, respectivamente. La tasa de curación parasitológica para sarolaner no fue inferior a moxidectin/imidacloprid en el día 60. Los recuentos de ácaros se redujeron en 77,2%, 95,0%, 98,5%, 99,0%, 100% y 100% en el grupo sarolaner y en 68,0%, 88,4%, 91,1%, 92,7%, 73,9% y 82,2% en el grupo moxidectin/imidacloprid, en los días 30, 60, 90, 120, 150 y 180, respectivamente, en comparación con los recuentos previos al tratamiento. Las lesiones cutáneas mejoraron a lo largo del estudio; la superficie corporal total afectada disminuyó en un 94% en el grupo tratado con sarolaner y en un 72% en el grupo de moxidectina/imidacloprid. No hubo efectos adversos relacionados con el tratamiento.

**Conclusiones –** la administración oral mensual de sarolaner fue segura y altamente efectiva en el tratamiento de la demodicosis generalizada en perros.

**Zusammenfassung**

**Hintergrund –** Die Behandlung der Demodikose des Hundes kann eine Herausforderung sein; es wird immer nach neuen Behandlungen gesucht.

**Ziel –** Die Wirksamkeit von Sarolaner wurde im Vergleich zu einem topischen Moxidectin/Imidacloprid Produkt in Bezug auf die Wirksamkeit bei einer generalisierten Demodikose von Hunden in einer randomisierten, einfachblinden, Multizentrum Feldstudie evaluiert.

**Tiere –** Es wurden Hunde im Privatbesitz monatlich mit Sarolaner *per os* (*n = 53*) oder mit wöchentlicher/monatlicher topischer Verabreichung von Moxidectin/Imidacloprid (*n = 28*) behandelt.

**Methoden –** Die Milben wurden monatlich in tiefen Hautgeschabseln gezählt und das Ausmaß der Hautveränderungen wurde evaluiert. Die Hunde beendeten die Studie, wenn an zwei aufeinanderfolgenden monatlichen Hautgeschabseln keine lebenden Milben mehr gefunden wurden oder spätestens am Tag 180 (Ende der Studie).

**Ergebnisse –** Eine parasitologische Heilung, die definiert wurde als das erste Mal, wo keine lebenden Milben in den Hautgeschabseln gefunden werden konnten, wurde bei 92,9% bzw 100% der Hunde nach drei bzw nicht mehr als fünf monatlichen Behandlungen mit Sarolaner festgestellt. In der Moxidectin/Imidacloprid Gruppe waren 77,3% bzw 91,7% der Hunde nach drei bzw sechs Monaten geheilt. Die parasitologische Heilungsrate für Sarolaner war Moxidectin/Imidacloprid am Tag 60 nicht unterlegen. Die Milbenzahlen waren an den Tagen 30, 60, 90, 120, 150 und 180 um 77,2%; 95,0%; 98,5%, 99,0%, 100% und 100% in der Sarolanergruppe bzw um 68,0%, 88,4%, 91,1%, 92,7%, 73,9% und 82,2% in der Moxidectin/Imidacloprid Gruppe im Vergleich zu den Milbenzahlen vor den Behandlungen reduziert. Die Hautveränderungen verbesserten sich im Verlauf der Studie; die insgesamt betroffene Körperoberfläche nahm mit Sarolaner um 94% und in der Moxidectin/Imidacloprid Gruppe um 72% ab. Es traten keine Nebenwirkungen durch die Behandlung auf.

**Schlussfolgerungen –** Die monatliche orale Administation von Sarolaner war sicher und hochwirksam bei der Behandlung der generalisierten Demodikose der Hunde.

**要約**

**背景 –** 犬ニキビダニ症は治療に苦慮することがあり、常に新しい治療法が求められている。

**目的 –** ランダム化単盲検多施設野外調査により、犬汎発性ニキビダニ症に対するサロラネルの有効性をモキシデクチン/イミダクロプリド局所製剤と比較検討した。

**動物 –** 飼育犬にサロラネル経口薬(n = 53)を1ヶ月毎、またはモキシデクチン/イミダクロプリド滴下薬(n = 28)を1週間毎または1ヶ月毎に投薬した。

**方法 –** 深部皮膚掻爬によるダニ虫体数を1ヶ月毎に計数したとともに、皮膚病変の重篤度を評価した。皮膚掻爬によって生存ダニを2ヵ月連続で検出しなかった場合、もしくは治療開始180日目を試験終了日とした。

**結果 –** 寄生虫学的治癒日については、皮膚掻爬において初めて生存ダニが検出されなかった日と定義した。サロラネル群では治療開始3ヶ月目および5ヶ月目に、それぞれ92.9%および100%の犬で治癒が確認された。モキシデクチン/イミダクロプリド群では治療開始3ヶ月目および6ヶ月後に、それぞれ77.3%および91.7%で治癒が確認された。治療開始60日目のサロラネル群における寄生虫学的治癒率は、モキシデクチン/イミダクロプリド群と同等であった。治療開始30日目,60日目,90日目,120日目,150日目および180日目におけるダニ虫体数の改善率は、サロラネル群では77.2%、95.0%、98.5%、99.0%、100%および100%であったのに対し、モキシデクチン/イミダクロプリド群では68.0%、88.4%、91.1%、92.7%、73.9%および82.2%であった。 皮膚病変は試験期間を通して改善し、サロラネル群で病変部が94%減少したのに対し、モキシデクチン/イミダクロプリド群では72%減少した。 治療に関連した有害事象は認められなかった。
**結論 –** サロラネルの1ヶ月毎の経口投与は犬にとって安全であり、犬汎発性ニキビダニ症に対して高い有効性を示した。

**摘要**
**背景 —** 犬蠕形螨病的治疗是一项挑战;且总是在探索新的治疗方案。
**目的 —** 在一项随机、单盲、多中心的研究中,治疗犬全身性蠕形螨病时,与外部使用莫西克丁/吡虫啉治疗相比,评价赛瑞拉纳的效用。
**动物 —** 私家犬每月口服赛瑞拉纳治疗 (n = 53) ,或者每周/每月外部使用莫西克丁/吡虫啉治疗(n = 28)。
**方法 —** 每月做一次皮肤深层刮片,统计蠕形螨的数量,并且评估皮肤病变的严重程度。当病犬连续两月的皮肤刮片没有发现活的螨虫时,或者治疗第180天时,可完成研究。
**结果 —** 当皮肤刮片首次发现没有活螨时,定义为寄生虫学治愈。每月口服赛瑞拉纳,在治疗第3个月和不超过5个月时,犬的寄生虫学治愈率分别达到92.9% 和100%。外用莫西克丁/吡虫啉组,在第3个月和第六个月,治愈率分别为77.3% 和 91.7%。在治疗第60天,赛瑞拉纳组的寄生虫治愈率不低于莫西菌素/吡虫啉组。与治疗前的螨虫数相比, 在治疗第30、60、90、120、150和180天时,赛瑞拉纳组的螨虫数量分别减少77.2%、95.0%、 98.5%、99.0%、100%和100%;而莫西菌素/吡虫啉组的螨虫数量分别减少68.0%、88.4%、91.1%、92.7%、73.9%和82.2%。整个研究期间皮肤症状得到改善;赛瑞拉纳组,犬体表皮肤总面积病变减少94%;莫西菌素/吡虫啉治疗组,犬体表皮肤总面积病变减少72%。没有发生与治疗相关的不良反应。
**结论 —** 每月口服推荐量的赛瑞拉纳,对于治疗犬全身性蠕形螨病安全且高效。

**Resumo**
**Contexto –** O tratamento da demodiciose canina pode ser desafiador, desta forma, novos tratamentos estão sempre sendo investigados.
**Objetivo –** Avaliou-se a eficácia do Sarolaner comparado a um produto tópico a base de moxidectina/imidaclorprida para o tratamento de demodiciose generalizada em cães, em um estudo de campo multicêntrico, randomizado e uni-cego.
**Animais –** Cães de clientes foram tratados mensalmente com sarolaner oral (*n* = 53) ou com moxidectina/imidaclorprida tópica mensal/semanalmente (*n* = 28).
**Métodos –** Os ácaros foram contados mensalmente por raspado cutâneo profundo e avaliou-se a gravidade das lesões cutâneas. Os cães completaram o estudo quando nenhum ácaro vivo foi encontrado em dois raspados cutâneos consecutivos intervalados de um mês ou, no mais tardar, no dia 180 (fim do estudo).
**Resultados –** A cura parasitológica, definida como a primeira vez em que não foram encontrados ácaros vivos nos raspados cutâneos, foi alcançada em 92,9% e 100% dos cães após três e não mais que cinco tratamentos mensais com sarolaner (respectivamente). No grupo da moxidectina/imidaclorprida, 77,3% e 91,7% dos cães foram curados após três e seis meses, respectivamente. A taxa de cura parasitológica para sarolaner foi não-inferior a moxidectina/imidaclorprida no dia 60. A contagem de ácaros foi reduzida em 77,2%, 95,0%, 98,5%, 99,0%, 100% e 100% no grupo sarolaner e em 68,8%, 88,4%, 91,1%, 92,7%, 73,9% e 82,2% no grupo moxidectina/imidaclorprida, nos dias 30, 60, 90, 120, 1250 e 180, respectivamente, comparado às contagens pré-tratamento. As lesões cutâneas melhoraram ao longo do estudo; a superfície corpórea afetada total foi reduzida em 94% no grupo sarolaner e em 72% no grupo moxidectina/imidaclorprida. Não foram observados efeitos adversos relacionados aos tratamentos.
**Conclusões –** A administração oral mensal de sarolaner foi segura e altamente eficaz no tratamento de demodiciose generalizada em cães.

 