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Efficacy of a novel formulation of metaflumizone plus amitraz for the treatment of sarcoptic mange in dogs

L.J. Fourie [a], D.J. Kok [a], A. du Plessis [b], D. Rugg [c,*]

[a] *ClinVet International, P.O. Box 11186, Universitas 9321, South Africa*
[b] *Fort Dodge Animal Health, Private Bag X211, Midrand 1685, South Africa*
[c] *Fort Dodge Animal Health, P.O. Box 5366, Princeton, NJ 08543, USA*

Abstract

A novel spot-on formulation containing metaflumizone plus amitraz (ProMeris®/ProMeris Duo® for Dogs, Fort Dodge Animal Health, Overland Park, KS) was evaluated for efficacy against sarcoptic mange mites in naturally infested dogs. Sixteen dogs were allocated to two equal groups and were housed individually. Eight of the dogs were treated topically with metaflumizone plus amitraz at the proposed minimum dose rate (20 mg/kg of each of metaflumizone and amitraz, at a dose volume of 0.133 ml/kg) on Days 0 and 28. The other eight were treated with metaflumizone plus amitraz at the proposed minimum dose rate on Days 0, 14, 28 and 42. To enumerate *Sarcoptes scabiei* mites, skin scrapings were taken on each of Days 2, 14, 28, 42 and 56. Clinical signs of mange and the extent of sarcoptic lesions were evaluated on each dog when scrapings were made. Evaluation of the efficacy of the treatment was based on the absence of mites supported by the absence of clinical signs associated with canine sarcoptic mange. Treatment with metaflumizone plus amitraz at the minimum proposed dose rate at monthly (two treatments) or two-weekly (four treatments) intervals resulted in a rapid reduction of mites and improved clinical signs. The overall cure rates at Day 56, based on zero mite counts and/or resolution of clinical signs were 75% and 83% of dogs for the monthly and two-weekly regimens, respectively.

Keywords: ProMeris®; ProMeris Duo ®; *Sarcoptes scabiei*; Metaflumizone; Amitraz; Mange; Dog

1. Introduction

Sarcoptic mange caused by the mite, *Sarcoptes scabiei* is highly contagious and one of the most uncomfortable skin diseases that a dog can contract (Doering and Jensen, 1973). The mite is also transmissible to humans. Diagnosis of mange is typically based on clinical signs and confirmed by the presence of mites in skin scrapings. The clinical signs and symptoms of sarcoptic mange include a fairly constant pruritus, alopecia, an erythematous rash and yellowish crusts that form on the skin of affected areas (Arlian et al., 1995). Canine scabies is often a progressive disease that is refractory to most symptomatic therapies (Bond, 1998). The presenting signs of sarcoptic mange are, however, varied and often misleading with some dogs never developing the "classical" lesions. A definitive diagnosis of sarcoptic mange is often problematic since it is difficult to detect the mites in skin scrapings.

Sarcoptic mange is generally amenable to chemotherapy. Lime-sulfur or amitraz dips are usually effective and topical treatment with fipronil was also reported to be useful (Curtis, 2004). Systemic treatment is based on the macrocyclic lactones. Selamectin (Shanks et al., 2000) and moxidection in combination with imidacloprid (Krieger et al., 2005) have been used as effective topical treatments. Off-label use of

* Corresponding author. Tel.: +1 732 631 5860; fax: +1 732 631 5832.
E-mail address: ruggd@pt.fdah.com (D. Rugg).

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macrocyclic lactones such as ivermectin and moxidectin at doses of 0.2–0.5 mg/kg given orally or by injection at treatment intervals of 1 or 2 weeks have been reported to be effective (Paradis, 1998; Wagner and Wendleberger, 2000; Curtis, 2004).

ProMeris®/ProMeris Duo® for Dogs (Fort Dodge Animal Health, Overland Park, KS) is a new product combining the novel insecticide metaflumizone with the acaracide amitraz in a spot-on formulation that provides excellent control of fleas and ticks for up to 1 month (Rugg et al., this volume). The safety of this novel formulation has been confirmed following multiple treatments at up to five times the proposed dose rate at two-weekly intervals (Heaney and Lindahl, this volume). Here we report on a study conducted to determine the efficacy of this formulation applied at monthly (two treatments) or two-weekly (four treatments) treatment intervals against sarcoptic mange in dogs.

2. Materials and methods

The study was done at ClinVet International, Bloemfontein, South Africa, and was conducted according to Good Clinical Practices (VICH, 2000) and in accordance with local animal welfare guidelines. The investigation was conducted with two treated groups consisting of eight animals per group.

2.1. Animals

Nine male and seven female adult dogs, all older than 6 months and purchased from various owners, were used in the study. The animals presented clinical signs of sarcoptic mange including, erythematous lesions, crusts, alopecia, hyperkeratosis and intense pruritis. The dogs were of various breeds, mainly mongrels and apart from the clinical signs associated with mange were otherwise healthy at veterinary assessment on Day 7. All dogs included in the study were positive for *S. scabiei* mites on Day 2. The animals weighed between 2.8 and 18.0 kg on Day 1. Each dog was identified using a neckband with numbered tag or by an electronic transponder with a unique alphanumeric code.

Dogs were housed individually under strict quarantine measures in pens that were approximately 3.7 m × 1.7 m with concrete flooring. The indoor sleeping area had under floor heating and the outdoor run area was covered to prevent exposure to rain. No contact between dogs was possible. The dogs were acclimated to the study conditions for 7 days prior to treatment, and were observed for general health at least once daily for the duration of the study.

The animals were fed an appropriate maintenance ration of a commercial dry dog feed for the duration of the study. Water was available *ad libitum*.

2.2. Experimental design

The investigation was conducted with two treated groups consisting of eight animals per group. For animal welfare considerations there was no negative control group. In addition, sarcoptic mange is generally refractory to symptomatic therapy (Bond, 1998) and in our experience, spontaneous recovery from infestation with *S. scabiei* is an unusual occurrence (Fourie et al., 2006).

2.3. Ranking and allocations

Animals were ranked by Day 1 body weight and randomly allocated to the different treatments.

2.4. Treatment

The animals were treated with a commercial formulation containing 150 mg metaflumizone and 150 mg amitraz/ml. Doses were calculated using pretreatment body weights and were applied to the skin as a single spot between the shoulder blades. Group 1 dogs were treated at the proposed minimum dose rate (20 mg/kg of each of metaflumizone and amitraz, at a dose volume of 0.133 ml/kg) on Days 0 and 28. Group 2 dogs were treated at the proposed minimum dose rate on Days 0, 14, 28 and 42.

2.5. Assessments

2.5.1. Counts of mites

Efficacy was based on the presence or absence of mites, supported by the clinical signs associated with canine sarcoptic mange. To assess the numbers of *S. scabiei* mites, skin scrapings (~4 cm^2) were taken on Days 2, 14, 28, 42 and 56 from five different body areas suspected of being infested. Skin scraping sites were recorded and these sites and/or sites of new lesions were scraped at each subsequent examination. Skin scrapes were made with a scalpel blade so that capillary oozing occurred. Each scraping was transferred to a marked (animal I.D., group and body region) microscope slide containing mineral oil and was examined under a stereomicroscope for the presence of live or dead mites and mite eggs. The numbers of *S. scabiei* mites (immatures and adults) and eggs counted in each scraping were recorded separately. If dogs had no