Efficacy of selamectin in the treatment of naturally acquired cheyletiellosis in cats

Nadège Chailleux, Manon Paradis

Abstract — The purpose of this study was to evaluate the efficacy of a topical formulation of selamectin in the treatment of cheyletiellosis in cats. Fifteen adult domestic cats from the same household with naturally occurring *Cheyletiella* sp. infestation were enrolled in the study. On each cat, 45 mg of selamectin was applied on days 0, 30, and 60. No other treatment or environmental decontamination was performed during the trial. On days 0, 30, 60, and 120, all cats were examined, epidermal debris was collected over the dorsal area of the body with flea combs for microscopic examination, and fecal flotations were done. Clinical signs had subsided by day 60 in all 15 cats and no signs of recurrence were apparent on follow-up 1 year later. All epidermal and fecal samples were negative by day 60. No adverse reactions were observed. Under the conditions of our study, topical selamectin was a practical and well-tolerated means of treatment for cheyletiellosis in cats.

Résumé — Efficacité de la sélamectine dans le traitement de la cheylétiellose féline. Le but de cette étude était d'évaluer l'efficacité d'une formulation topique de sélamectine dans le traitement de la cheylétiellose chez le chat. Quinze chats domestiques adultes, provenant de la même maisonnée, naturellement infestés par *Cheyletiella* sp. ont reçu une application de 45 mg de sélamectine aux jours 0, 30 et 60. Aucun traitement ou décontamination environnementale n'a été effectué durant l'étude. Aux jours 0, 30, 60 et 120, tous les chats ont été examinés et des débris épidermiques, prélevés sur la région dorsale avec un peigne à puces, ont été examinés au microscope. De plus, des flottaisons fécales ont été faites pour chaque chat à chaque temps. Chez tous les chats, les signes cliniques étaient résolus au jour 60 et après un an, ils étaient toujours exempts de signes cliniques. Tous les prélèvements étaient négatifs au jour 60. Aucune réaction indésirable n'a été observée. Selon les conditions de notre étude, la sélamectine topique s'est révélée une forme de traitement pratique et bien toléré pour la cheylétiellose féline.

(Traduit par les auteurs)

Can Vet J 2002;43:767–770

Introduction

Cheyletiellosis is a highly contagious mite infestation of dogs, cats, and rabbits (1–3). Traditional treatments include weekly applications of various topical acaricidal products; nowadays ivermectin is frequently used systemically at an off-labeled dose and indication. The latter is practical, economical, and very effective (4–8). However, idiosyncratic reactions in collies and other herding breeds, as well as neurologic signs in cats, have been reported (7,9–11).

Selamectin is a novel endectocide with a unique combination of efficacy and safety in dogs and cats following both oral and topical administration (12,13). This avermectin was recently licensed for use in Canada and is formulated to provide a minimum of 6 mg/kg body weight (BW) topically (up to 12 and up to 15 mg/kg BW in dogs and cats, respectively), once a month, for the prevention of infestation of *dirofilaria*, fleas, and *Otodectes cynotis* in dogs and cats, as well as *Sarcoptes scabiei* in dogs, and gastrointestinal nematodes (roundworms, hookworms, and whipworms) in cats (14–18). Selamectin is, in fact, the first endectocide designed for companion animals that combines anthelmintic activity and ectoparasiticidal activity. Selamectin and ivermectin share a similar mode of action and apparently a similar spectrum of activity (12).

No information is available on the efficacy of selamectin in cheyletiellosis in any species. The purpose of this clinical study was to evaluate the efficacy of selamectin in the treatment of a *Cheyletiella* sp. in naturally infested cats.

Département de sciences cliniques, Faculté de médecine vétérinaire, Université de Montréal, CP 5000, St-Hyacinthe, Québec J2S 7C6.

Address correspondence to Dr. Nadège Chailleux.

Reprints will not be available from the authors.

Funding: Revolution® was supplied by Pfizer Canada.

Materials and methods

Cats

Fifteen domestic cats (8 neutered males, 7 spayed females) with a naturally occurring *Cheyletiella* sp.

infestation were enrolled in this study. All cats were from the same household and kept exclusively indoors during the treatment period. Ages ranged from 9 to 13 y with a mean age of 10 y. Body weights ranged from 3 to 7.5 kg with a mean BW of 5 kg. Twelve cats had short hair, and 3 cats had semi-long hair. Routine vaccinations were current for all cats. One cat had renal insufficiency and another had a cardiac insufficiency, however, both were controlled with medication. One cat was obese. The household was shared with 2 adult dogs that had limited contact with the cats but had access to outdoors. These 2 dogs, although asymptomatic and negative on microscopic examination of epidermal debris, received the same treatment protocol with selamectin as the cats in order to prevent infestation.

Each cat received 3 topical treatments, 30 d apart; 45 mg (0.75 mL) of selamectin topical solution (Revolution®; Pfizer Canada, London, Ontario) was applied at 1 spot on the skin, in front of the shoulder blades, on days 0, 30, and 60. The dose and interval between applications was the same as for the approved protocols for other parasites (a 45 mg vial is intended for 2.6 to 7.5 kg cats). The dose administered to cats varied between 6 and 15 mg/kg BW, with a mean dose of 9 mg/kg. The 2 dogs (21 and 30 kg BW) received 240 mg of selamectin each (11.4 and 8 mg/kg BW, respectively) on days 0, 30, and 60. No other treatment or environmental decontamination was performed during the trial.

Diagnostic procedures

On days 0, 30, 60, and 120, all cats were examined, and a flea comb was used to collect hair and epidermal debris over the dorsal aspect of the body. The material collected with the flea comb was examined each time by at least 2 of the following methods: (1) Dissecting microscope: hairs and epidermal debris were placed in a petri dish and examined at 25 × magnification; (2) Potassium hydroxide (KOH) and flotation technique: hairs and epidermal debris were placed in ~ 1 mL of a 10% KOH solution and heated for 10 to 20 min to digest hairs and scales. The mixture was stirred, centrifuged, and the supernatant discarded. A concentrated sucrose solution was then added to the sediment, a cover slip was applied to the surface of the solution, the samples were again centrifuged, and, finally, the cover slip was transferred to a slide and examined under a microscope at 40 × magnification; and (3) Direct microscopic examination: hairs and epidermal debris were placed directly on a microscope slide, covered with a few drops of mineral oil and a cover slip, then examined under a microscope at 40 × magnification.

The KOH and flotation technique was used in all cats on day 0, because a relatively large quantity of hair was collected with the flea comb. On days 30, 60, and 120, the amount of hair collected was generally much less than on day 0 (which appeared to correlate with clinical improvement); thus, for most examinations made on days 30, 60, and 120, the dissecting microscope and direct microscopic examination were the only techniques that were used.

Stool samples were collected from each cat on days 0, 30, 60, and 120. Fleet enema was used in some cats, when required, to obtain stool samples. Fecal flotation, using double centrifugation and a concentrated sucrose solution, was performed on all samples.

Results

Cats

On day 0, all 15 cats had clinical signs compatible with cheyletiellosis. Pruritus, which was present in 15/15 cats, was considered mild to moderate in 13 cats and severe in 2 cats. Fourteen cats showed dorsal scaling and crusting, including 2 with alopecia and excoriation.

On day 30, a great clinical improvement was noted. Mild scaling was still present in most cats, but no crusts or excoriations were seen. Pruritus had resolved in 11 cats and was minimal in 4 cats. On day 60, all clinical signs had resolved, with the exception of very mild dorsal scaling that was still present on the obese cat. This was attributed, at least in part, to the reduced ability of this cat to groom this area. On day 120, all cats were asymptomatic and they were still free of signs of recurrence on follow-up examination 1 y later.

Humans

On day 0, zoonotic lesions consisting of pruritic, erythematous papules on the neck and chest area were present on the owner. These lesions gradually subsided and were completely resolved by day 30, without treatment. This spontaneous resolution is indeed expected following eradication of the parasites on the animals since this parasite cannot complete its life cycle on humans.

Laboratory results

On day 0, *Cheyletiella* mites, or eggs, or both were observed in hair and epidermal debris of 4/15 cats and in fecal samples of 5/15 cats. A total of 8/15 cats had positive results from either hair and skin debris or fecal samples (only 1 cat was positive in both skin and feces). The number of parasites (mites or eggs) found was relatively low. Fifteen *Cheyletiella* mites and 30 eggs were observed overall, either from hair and epidermal debris or from fecal analysis. All skin and fecal samples were negative on days 30, 60, and 120, except for 1 mite in 1 fecal sample on day 30.

No significant adverse reactions were observed. One cat developed a small area of alopecia and mild scaling at the site of application of the drug, which resolved in the following weeks.

Discussion

Cheyletiellosis is a very contagious dermatosis caused by relatively large (500 μm × 350 μm) mites living on the skin surface. *Cheyletiella* mites are obligate parasites and have a life cycle of approximately 3 to 4 wk in total. They are not host specific and may transfer readily between dogs, cats, and rabbits. In addition to direct transmission, infestation may occur indirectly via fomites such as leashes, grooming tools, or even other, larger arthropods, such as fleas, lice, and flies (1). Eggs are bound to hair shafts, which, when shed, can also act as an environmental reservoir of infection (1–3). Given this lack of host specificity and the fact that the mites are capable of surviving away from the host for at least

10 d in suitable environmental conditions, it is imperative that all in-contact pet mammals, their paraphernalia, and their environment be included in the treatment program. However, environmental treatment is not always performed nowadays, as long as treatment duration is adequate. Indeed, treatment duration, which should cover a minimum period of 6 to 8 wk, is directly influenced by the severity of the infestation, the number of animals involved, the acaricidal product chosen, and whether or not there is concomitant topical or environment decontamination, or both.

Scaling and pruritus are the main signs of the disease in animals (1–3). The intensity of the pruritus is usually mild to moderate, but sometimes appears disproportionate to the apparent low numbers of mites. This might be due to a hypersensitivity reaction to the mite (19). An asymptomatic carrier state also exists and this should be borne in mind when tackling problem cases in which repeated reinfestation and zoonotic transmission is occurring. Humans in contact with pets carrying *Cheyletiella* spp. are at risk of becoming transiently infested themselves, producing an uncomfortable, pruritic dermatosis, characterized by papular lesions that, typically, appear on the arms, legs, trunk, and buttocks (1–3). However, as *Cheyletiella* spp. are not capable of reproducing on humans, appropriate treatment of the pet host should prevent further infestation, making human acaricidal therapy unnecessary.

The ease of finding the mite or its eggs is variable. It can be especially difficult in cats because of their natural grooming habits. Diagnosis is made by direct viewing of the mite, microscopic examination of the products of superficial skin scrapings, acetate tape preparations or flea combing (with or without dissolution of hair and debris with KOH), or fecal flotations (1,4–6). The "KOH and flotation technique" has been reported to be one of the most reliable methods. However, this test was negative in 58% of clinically infested cats in 1 study (4). In the present study, positive results were obtained in only 4/15 (26.6%) cats with this technique, as compared with 5/15 (33.3%) with fecal flotation. Although not performed very frequently, fecal flotation may indeed be particularly useful for the detection of ingested mites and ova in cats, due to their grooming habits. In spite of the fact that a minimum of 3 diagnostic procedures were used simultaneously in each cat, a positive result was obtained in only 8/15 (53.3%). Therefore, in many cases, the diagnosis can be confirmed only by the response to treatment with an acaricidal trial. Moreover, an appropriate acaricidal trial is always required in order to rule out cheyletiellosis.

There are currently no licensed veterinary products specifically indicated for the treatment of cheyletiellosis. The mites are susceptible to several of the insecticidal and acaricidal formulations that are available, however, weekly applications of lime sulfur dips, pyrethrin sprays or shampoos, in conjunction with regular treatment of the environment, are also effective (1). Alternative topical treatment options are applications of a 0.25% fipronil spray (not available in Canada) (20). Animals that resent or do not tolerate topical therapy can be treated systemically with ivermectin. It is practical, economical, and very effective when administered at a dose of 200 to 400 μg/kg BW, PO, q7d or SC and pour-on, q14d to cover a minimum period of 6 to 8 wk (1,4–6,8). However, it is an off-label use in cats and dogs, and idiosyncratic reactions in collies and other herding breeds, as well as neurological signs in cats, particularly kittens, have been reported (9–11). In dogs, milbemycin oxime, another macrocyclic lactone, has been shown to be effective in the control of cheyletiellosis, but its use has not been reported in cases of feline cheyletiellosis (19).

In this study, although there was no control group, the treatment regimen with selamectin appeared effective in the clinical control of a *Cheyletiella* sp. infestation. It is not known if the 3rd selamectin application was required to eradicate the mites. However, because of the notorious difficulty in isolating the mites and the insidious nature of the infestation, as well as the fact that many animals can be asymptomatic carriers, it would seem to be advisable to administer a minimum of 3 applications of selamectin.

Under the conditions of our study, topical selamectin was an effective, practical, and well-tolerated means of treatment for cheyletiellosis in cats. Further studies are needed to corroborate these findings and to determine its efficacy in canine cheyletiellosis.

Acknowledgments

We thank Mrs. Francine Lavoie for technical assistance and Dr. Josée Dupras for her collaboration. CVJ

References

1. Scott DW, Miller WH Jr, Griffin CE. In: Muller & Kirk's Small Animal Dermatology, 6th ed, Philadelphia; WB Saunders. 2001:423–516.
2. Paradis M. Mite dermatitis caused by *Cheyletiella blakei*. J Am Acad Dermatol 1998;38:1014–1015.
3. Wagner R, Stallmeister N. *Cheyletiella* dermatitis in humans, dogs and cats. Br J Dermatol 2000;143:1110–1112.
4. Paradis M, Scott DW, Villeneuve A. Efficacy of ivermectin against *Cheyletiella blakei* infestation in cats. J Am Anim Hosp Assoc 1990;26:125–128.
5. Paradis M, Villeneuve A. Efficacy of ivermectin against *Cheyletiella yasguri* infestation in dogs. Can Vet J 1988;29: 633–635.
6. Pagé N, de Jaham C, Paradis M. Observations on topical ivermectin in the treatment of otoacariosis, cheyletiellosis, and toxocariosis in cats. Can Vet J 2000;41:773–6.
7. Paradis M. Ivermectin in small animal dermatology. Part I. Pharmacology and toxicology. Compend Contin Educ Pract Vet 1998;20:193–200.
8. Paradis M. Ivermectin in small animal dermatology. Part II. Extralabel applications. Compend Contin Educ Pract Vet 1998; 20:459–469.
9. Hopper K, Aldrich J, Haskins SC. Ivermectin toxicity in 17 Collies. J Vet Intern Med 2002;16:89–94.
10. Lewis DT, Merchant SR, Neer T.M. Ivermectin toxicosis in a kitten. J Am Vet Med Assoc 1994;205:584–586.
11. Rowley J. Ivermectin toxicity in two kittens. Companion Anim Pract 1988;2:31–32.
12. Bishop BF, Bruce CI, Evans NA, et al. Selamectin: a novel broad-spectrum endectocide for dogs and cats. Vet Parasitol 2000;91:163–176.
13. Krautmann MJ, Novotny MJ, De Keulenaer K, et al. Safety of selamectin in cats. Vet Parasitol 2000;91:393–403.
14. Shanks DJ, McTier TL, Rowan TG, et al. The efficacy of selamectin in the treatment of naturally acquired aural infestations of *Otodectes cynotis* on dogs and cats. Vet Parasitol 2000;91: 283–290.
15. Six RH, Clemence RG, Thomas CA, et al. Efficacy and safety of selamectin against *Sarcoptes scabiei* on dogs and Otodectes cynotis on dogs and cats presented as veterinary patients. Vet Parasitol 2000;91:291–309.

16. McTier TL, Shanks DJ, Watson P, et al. Prevention of experimentally induced heartworm (*Dirofilaria immitis*) infections in dogs and cats with a single topical application of selamectin. Vet Parasitol 2000;91:259–268.
17. Boy MG, Six RH, Thomas CA, et al. Efficacy and safety of selamectin againts fleas and heartworm in dogs and cats presented as veterinary patients in North America. Vet Parasitol 2000;91:233–250.
18. McTier TL, Jones RL, Holbert MS, et al. Efficacy of selamectin againts adult flea infestations (*Ctenocephalides felis felis* and *Ctenocephalides canis*) on dogs and cats. Vet Parasitol 2000;91:187–199.
19. White WD, Rosychuk RAW, Fieseler KV. Clinicopathologic findings, sensitivity to house dust mites and efficacy of milbemycin oxime treatment of dogs with findings *Cheyletiella* sp. infestation. Vet Dermatol 2001;12:13–18.
20. Chadwick AJ. Use of a 0.25 per cent fipronil pump spray formulation to treat canine cheyletiellosis. J Small Anim Pract 1997;38:261–262.

BOOK REVIEW

COMPTE RENDU DE LIVRE

Legood G, ed. ***Veterinary Ethics: An Introduction.*** Continuum Publishing, London, 2000, 206 pp, ISBN 0-8264-4784-8. CDN$38.95.

Veterinarians are often on the ethical front lines. Balancing the demands of animal health, clients, industry, employers, society, business, and animal welfare is a task for which we are sometimes poorly prepared. This book provides information and ideas that can help. It presents the veterinary perspective on ethics and animal welfare as it applies to most forms of animal use. It is an introductory work intended to assist veterinarians in addressing ethical dilemmas. Written from the British perspective, it is designed to be an adjunct to the Royal College of Veterinary Surgeons (RCVS) "Guide to Professional Conduct."

The book takes a multi-disciplinary approach to veterinary ethics covering a wide range of animal uses. Each chapter is written by an expert with over half of the contributors being veterinarians. Other contributors are philosophers, theologians, lawyers, research scientists, and veterinary administrators. The book is divided into 2 parts, the first being general and the second, more specific. Part 1 includes ethical, historical, legal, and administrative aspects of animal use. Part 2 covers a broad range of ethical concerns faced by veterinarians with respect to companion animals, large animals, food safety, public health, wild animals, zoo animals, animals used in sport, exotic animals, animals used in research, and genetic engineering. The contributors present background information and discuss the ethical issues. The information presented in all chapters is interesting, useful, and would contribute to any veterinarian's understanding of related problems. For example, Part 1 contains some basic ethics useful in solving ethical dilemmas. Part 1 also elaborates British animal protection law, including the meaning of such terms as "unnecessary suffering." It discusses different ethical approaches to animal use and how animals are valued. Also included are such topics as professional ethics, self-regulation, and the function and operation of the RCVS.

Part 2 presents useful and thought-provoking information that focuses on the balance between ethics and animal welfare. Discussed are problems relating to veterinarian/client relationships, veterinarian/veterinarian relationships, emerging issues, the conflict between food quality and the ethical treatment of animals, the moral conflict between environmentalism and welfarism, and the ethical review process in the use of animals in science, to name a few.

This paperback provides good value for its cost. It is indexed and gives a brief biography of each contributor. It is attractive, very readable, and current. It would be of interest to any veterinarian, as well as others interested in animal use. There are, however, some limits to the usefulness of this book in North America. A significant percentage of the book relates directly to British laws, regulations, procedures, licensing, and methods of doing things, which would be of little practical interest to Canadians. The book contains a few terms uncommonly used here, like "lairage" and "knock-on effect." Although most of the ethics presented is very well done, that presented by some contributors is weak or confusing. The text is repetitive in a few places. The strengths of the book are its broad spectrum and its presentation of basic theory and useful, detailed information, followed by current issues and dilemmas. It causes the veterinarian to think and provides some tools to begin solving ethical dilemmas relating to animal use.

Reviewed by ***Beverley J. Schneider, DVM, PhD,*** *Lecturer in Bioethics, Faculty of Forestry and Environmental Management, University of New Brunswick, P.O. Box 4400, Fredericton, New Brunswick E3B 5A3.*