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Therapeutic effect of a Formulation Containing Imidacloprid and Moxidectin in Pet Rabbits with Cheyletiellosis

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Abstract : Cheyletiellosis is a very common infestation in pet rabbits that causes dermatosis with pruritus and scale. In this study, thirty two rabbits with cheyletiellosis were treated with a single dermal application of a formulation containing imidacloprid 10% (w/v) and moxidectin 1% (w/v) at a dose 0.4 ml. The therapeutic effects of the formulation were 100% at 4, 8 and 12 weeks without adverse reactions. This suggests that a formulation containing imidacloprid and moxidectin is an effective treatment for cheyletiellosis in rabbits.

Key words **:** Imidacloprid, moxidectin, cheyletiellosis, rabbit.

Introduction

Cheyletiellosis is the most important common zoonotic mite that affect the skin of humans and domestic animals such as rabbits, dogs and cats (1,3,5,12). Three species of mites can travel freely between various host species. In general, *Cheyletiella yasguri, Cheyletiella blakei* and *Cheyletiella parasitovorax* are found in dogs, cats and rabbits, respectively (11). *Cheyletiella parasitovorax* (*C. parasitovorax*) lives on surface of the skin, and creates pseudo-tunnel through the scale and debris on the skin surface in rabbits. As in other species, the term 'walking dandruff' can be applied to cheyletiellosis. The entire life cycle of *C. parasitovorax* occurs on the host and is completed in approximately 35 days (1,5). However, the mites can survive away from the host for at least 10 days under suitable environmental conditions. Therefore, it is important that both the animals and their environment be included in the treatment procedure.

Many rabbits harbor the mite with no clinical signs. However, a severe infestation of *C. parasitovorax* can cause pruritus, alopecia and scales along the back and particularly above the tail base and on the neck of affected rabbits. Environmental control is essential for the elimination of an infestation in rabbits (5).

There is no ectoparasiticidal drug that is licensed for use in rabbits. In clinics, the treatment of a mite infestation in rabbits involves selenium sulphide shampoo (5), selamectin (6) and injectable drugs such as ivermectin (2,10), doramectin (13) and eprinomectin (9). However, there are no reports about the therapeutic effect of a formulation containing imidacloprid and moxidectin against cheyletiellosis in pet rabbits.

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The aim of this study was to evaluate the therapeutic effect of a topical application with a formulation containing imidacloprid and moxidectin for the treatment of cheyletiellosis in pet rabbits.

Materials and Methods

Animals

Thirty two rabbits (2 to 3 months old, 0.5 to 1.0 kg, fifteen females and seventeen males) with cheyletiellosis were used in this study. The rabbits were privately owned by different owners and were living indoors.

Diagnosis

Tape stripping and flea combing were performed in all the rabbits examined, and *Cheyletiella* spp. was detected by a microscopic examination. Each rabbit was re-evaluated at 4, 8 and 12 weeks after treatment.

Treatment

Cheyletiellosis was treated with a single dermal application of a solution containing imidacloprid 10% (w/v) and moxidectin 1% (w/v) (Advocate®, Bayer Health Care, Australia) at a dose of 0.4 ml at the base of the neck without other treatments. Sodium hypochlorite bleach was used for environmental decontamination during this study.

Results

A total thirty two rabbits with cheyletiellosis were treated with a single dermal application of a formulation containing imidacloprid 10% (w/v) and moxidectin 1% (w/v) at a dose of 0.4 ml. Mild scale was observed in all rabbits, and severe pruritus was observed in four rabbits. The culture for der-

Fig 1. Optical microscopy image of *Cheyletiella* spp. collected from the fur of a rabbit.

Fig 2. The back of a rabbit(mild scale was observed prior to treatment).

Fig 3. The back of a rabbit(no scale was observed after treatment).

matophytes was negative. After tape stripping and flea combing in all rabbits, *Cheyletiella* spp. was detected by a microscopic examination (Fig 1).

Signs of remission of pruritus became visible to the pet owners at 1 week after treatment. After 4 weeks of the treatment, there were no clinical signs, such as scale and pruritus (Fig 2 and Fig 3), and no mites or eggs were observed in any rabbit. There were apparent no signs of recurrence on the follow-up study 12 weeks later. During the experimental period, there were no adverse reactions such as alopecia, depression and poor appetite, and all rabbits were clinically healthy.

Discussion

Many species of ectoparasite may be infested in pet rabbits. *Cheyletiella* spp. is reported to be a common ectoparasite in rabbits (1,5). *Cheyletiella* spp. are obligate non-burrowing mite that lives on the keratin layer of the epidermis. Many rabbits harbor the mite with no clinical sign. Flatt *et al.* (3) reported a survey of fur mites in domestic rabbits. Fur mites were found in 43.2% of 220 rabbits examined. *Leporacus gibbus* was found in 7.3% of the 220 rabbits examined. Over 50% of the rabbits examined had inapparent mite infestations. Also, Niekrasz *et al.* (8) reported that *Leporacus gibbus* was found in 75% of the 52 New Zealand White Rabbits. Diagnosis is based on microscopic examination of acetate tape stripping and hair debris collected with a flea comb. Treatment for ectoparasite in rabbits include various drugs. However, bathing with a selenium sulphide shampoo is difficult on account of the rabbit's dense fur and its aversion to water. Although there are effective injectable drugs available for ectoparasites, it is inconvenient to make several visits to a veterinary hospital for treatment not to mention the injection pain.

A new dermal product Advocate was developed containing imidacloprid and moxidectin, which is administered as a viable topical application to the skin at a single site on dogs and cats. This drug is a broad-spectrum anti-parasitic remedy that is against fleas, and in the prevention of the heartworm disease and gastrointestinal nematodes in dogs and cats. The safety of this product has been established in animals over 6 and 8 weeks old. However, the safety of this product has not been examined during pregnancy and lactation.

Mehlhorn *et al.* (7) reported that mite infestations in reptiles could be eliminated using treatment with formulation containing imidacloprid and moxidectin. In rabbits, Hansen *et al.* (4) successfully treated ear mite infestations with 3 applications of imidacloprid (40 mg) and moxidectin (4 mg).

In this study, rabbits with cheyletiellosis were treated with a single dermal application of a formulation containing imidacloprid 10% (w/v) and moxidectin 1% (w/v) at a dose of 0.4 ml. The therapeutic effect of the formulation was 100% at 4, 8 and 12 weeks, respectively and there were no adverse reactions. In a study by Hansen *et al*, ear mite infestations were treated with 3 applications. In contrast, cheyletiellosis in this study were successfully treated with only one applicatiom

Although cheyletiellosis is not a fatal disease in rabbits, it is an important zoonotic ectoparasite that can cause dermatosis in domestic animals and humans. There is a risk that humans

can be infested with cheyletiellosis from newly adopted pet rabbits. Young and newly adopted pet rabbits should be examined and treated for cheyletiellosis.

In conclusion, a single topical application with a formulation containing imidacloprid and moxidectin was thought to be effective for treatment of Cheyletiellosis in pet rabbits.

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애완 토끼 털응애 감염증에 있어서 Imidacloprid와 Moxidectin 합제의 치료 효과

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요 약 : 애완토끼에서 털응애증은 가려움증과 비듬을 동반한 피부염을 유발하는 가장 흔한 외부 기생충이다. 본 연구에서 털응애에 감염된 총 32두의 애완 토끼에 imidacloprid 10% (w/v)와 moxidectin 10% (w/v) 합제 0.4 ml를 적용하였다. 적용한 합제의 치료율은 4, 8 및 12주에 각각100%이었으며, 부작용은 관찰되지 않았다. 본 연구에서 imidacloprid와 moxidectin 합제는 토끼의 털응애 치료에 효과적이었다.

주요어 : Imidacloprid, moxidectin, 털응애증, 토끼