

## Use of a Combination Imidacloprid and Permethrin for Psoroptic Mite Infestation in Three Pet Rabbits

Sang-Hun Kim, Kyeong-Ha Choi and Duck-Hwan Kim<sup>1</sup>

College of Veterinary Medicine, Chungnam National University, Daejeon 305-764, Korea

(Accepted : December 09, 2009)

**Abstract :** Psoroptic mites can cause severe pruritic otitis externa with crusts in rabbits. In this case report, three rabbits with a psoroptic mite infestation were treated with a formulation containing 10% imidacloprid and 50% permethrin at a dose of 0.4 ml regardless of body weight. One week after treatment, the rabbits showed mild pruritus with no crusts, mites or eggs. Four weeks after treatment, there were no clinical signs, mites or eggs observed in the rabbits. The rabbits were treated successfully with this combination without adverse reactions for 8 weeks after treatment. This case report suggests that a single topical application of a combination of imidacloprid and permethrin may be an effective and practical treatment for psoroptic mite infestations in pet rabbits.

**Key words :** psoroptic mite, ear mite, imidacloprid, permethrin, rabbit.

### Introduction

Many species of ectoparasites can infest pet rabbits. *Psoroptes cuniculi* (*P. cuniculi*) is a common mite found on rabbits. It is a non-burrowing mite that causes crusty exudates in the external ear canal and pinna (13). The life cycle is less than three weeks, and adult mites can survive off the host for between 4 to 21 days at a relative humidity and temperature ranging from 20% - 99%, and 5 - 30°C (1). *P. cuniculi* can cause severe dermatitis and otitis. The clinical signs include head shaking, scratching of the ear and sometimes head tilting. The development of crusts and scabs is common in psoroptic mites, and the removal of these crusts and topical treatment has been reported to cause pain in affected rabbits. In addition, secondary bacterial infections can lead to tympanic membrane perforation by the otitis media as well as meningitis (13). Moxidectin, acaricidal ear drops, ivermectin, eprinomectin and selamectin have been used to treat psoroptic mite infestations (2,4,7,11-13).

A new dermal product Advantix<sup>®</sup> (Bayer Health Care, Australia) containing imidacloprid and permethrin was developed for dogs. The product is administered as a topical application to the skin on a single site for the control of ticks and fleas. The safety of this product has been established in dogs over 7 weeks old, and this product is safe for use during pregnancy and lactation (5,8). However, it is not currently approved for use in rabbits in South Korea and other countries. Many studies of a combination imidacloprid and permethrin reported limited control of ticks, fleas and sand flies

in dogs (4-6,8-10).

The authors report a case of a topical application with a formulation containing imidacloprid and permethrin for the treatment of a psoroptic mite infestation in three pet rabbits.

### Case

Three rabbits (1 year old male with a body weight of 2.3 kg, 8 months old castrated male with a body weight of 1.8 kg, and a 4 month old female with a body weight of 1.4 kg) presented with severe scratching and crusts on the ear. The rabbits had no other problems. The physical examination revealed severe crusts, erythma and mild hemorrhage by self-trauma in the pinna (Fig 1a). A psoroptic mite infestation was diagnosed by a microscopic examination of the crusts in the pinna (Fig 2).

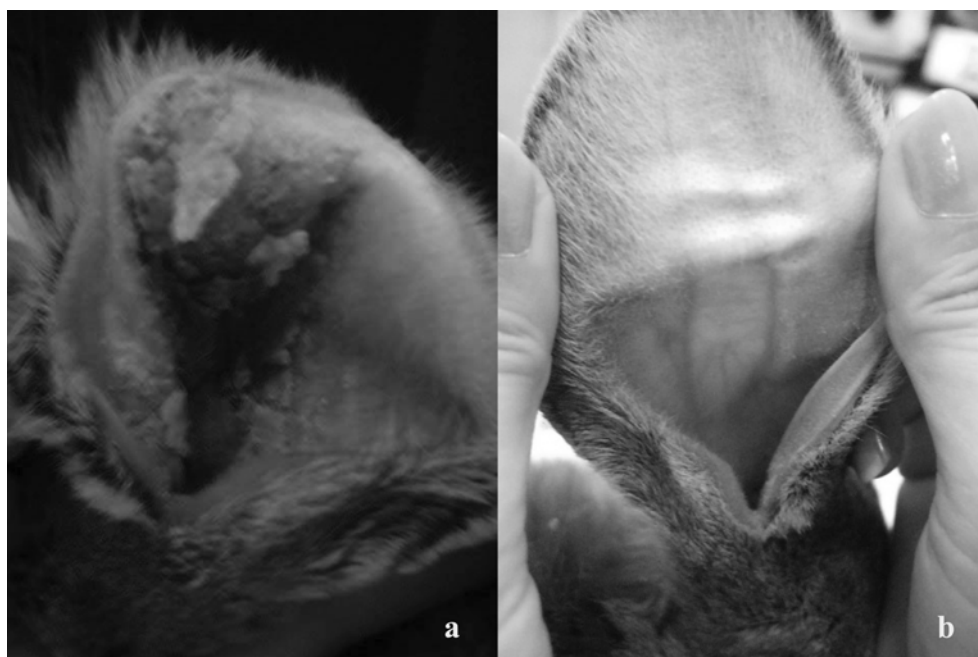
The rabbits were treated with a single dermal application of a combination 10% imidacloprid and 50% permethrin at a dose of 0.4 ml regardless of body weight at the base of the neck according to the manufacturer's instructions. No other treatments were administered during the treatment period. The rabbits were re-evaluated at 1, 2, 4 and 8 weeks after treatment. No attempts were made to estimate the mite burden.

One week after treatment, the rabbits showed mild pruritus with no crusts (Fig 1b), mites or eggs. After 4 weeks of treatment, there were no clinical signs, mites or eggs observed in the rabbits. There were no adverse reactions, such as poor appetite and depression. No recurrence was detected at 8 weeks after treatment.

### Discussion

In this case report, three rabbits with a psoroptic mite infes-

<sup>1</sup>Corresponding author.  
E-mail : dhkim@cnu.ac.kr



**Fig 1.** (a) The rabbit showed crusts, erythema and mild hemorrhage before treatment. (b) There were no crusts after 1 week of treatment in the same rabbit shown in Fig 1 (a).



**Fig 2.** Microscopic examination of the crusts in the pinna revealed psoroptic mite ( $\times 100$ ).

tation were treated with a single dermal application of a combination of 10% imidacloprid and 50% permethrin. The rabbits were treated successfully and did not show any adverse reactions at 8 weeks after treatment.

*P. cuniculi* is the common ear mite of rabbits that causes crusting and ulceration of the external ear canal. Although *P.*

*cuniculi* inhabits the ear canal, an infestation can spread to other areas such as the perineal skin fold and ventral abdomen (1,13).

Some studies reported the treatment of *P. cuniculi* infestation in rabbits. Rabbits with a *P. cuniculi* infestation were injected subcutaneously with a single dose of ivermectin at 0.2 mg/kg or 0.4 mg/kg. However, the regression of lesions was faster in the rabbits administered 0.4 mg/kg ivermectin (12). Curtis *et al.* (3) reported that ivermectin injected subcutaneously at 0.4 to 0.44 mg/kg of body weight and repeated 18 days later appeared to be safe and effective in reducing the prevalence of ear mites in naturally infested rabbits. On the other hand, Bowman *et al.* (2) reported that the efficacy of a two-injection ivermectin treatment with a total dose of 0.1 mg/kg, 0.2 mg/kg and 0.4 mg/kg was 77.96%, 99.61% and 99.61%, respectively.

Mctier *et al.* (7) reported that the topical application of selamectin at a dose of 6 or 18 mg/kg could completely eliminate mites from rabbits naturally infested with *P. cuniculi*.

Pan *et al.* (11) reported that a single dose of eprinomectin at 0.2 or 0.3 mg/kg subcutaneously could eliminate a *P. cuniculi* infestation in rabbits, and a dose of eprinomectin at 0.1 mg/kg could significantly reduce the number of mites but was unable to totally eliminate *P. cuniculi*.

A combination of imidacloprid and permethrin was developed for flea control in dogs.

In this case report, three rabbits with psoroptic mite infestations were treated with a single dermal application of a combination of 10% imidacloprid and 50% permethrin at a dose 0.4 ml regardless of body weight. This treatment was more convenient than injected drugs without injection pain,

and required only one application in a similar manner to selamectin but without the inconvenience of making several visits to a veterinary hospital for treatment. An otoscopic examination of the ear and a microscopic examination of the sample of the external ear canal before treatment showed live psoroptic mites. No live mites or crusts were observed on the rabbits after 1 week but the rabbits showed mild pruritus. After 2 months, all rabbits were cured with no clinical signs. No adverse reactions were noted in the treated rabbits. Because the life cycle of the psoroptic mite is less than three weeks, a single administration of an imidacloprid and permethrin formulation proved to be sufficient to eradicate a psoroptic mite infestation.

To the best of the author's knowledge, this is the first report of the treatment of a psoroptic mite infestation using a combination of imidacloprid and permethrin in rabbits. However, only three rabbits were treated. Therefore, further studies will be needed to confirm and support these results, as well as to evaluate the safety of a combination of imidacloprid and permethrin.

This case report suggests that a single topical application of a imidacloprid and permethrin combination is an effective and practical treatment for psoroptic mite infestations in pet rabbits.

## References

1. Arlian LG, Kaiser S, Estes SA, Kummel B. Infestivity of *Psoroptes cuniculi* in rabbits. *Am J Vet Res* 1981; 42: 1782-1784.
2. Bowman DD, Fogelson ML, Carbone LG. Effect of ivermectin on the control of ear mites (*Psoroptes cuniculi*) in naturally infested rabbits. *Am J Vet Res* 1992; 53: 105-109.
3. Curtis SK, Housley R, Brooks DL. Use of ivermectin for treatment of ear mite infestation in rabbits. *J Am Vet Med Assoc* 1990; 196: 1139-1140.
4. Doyle V, Beugnet F, Carithers D. Comparative efficacy of the combination fipronil-(S)-methoprene and the combination permethrin-imidacloprid against *Demacantor reticulatus*, the European dog tick, applied topically to dogs. *Vet Ther* 2005; 6: 303-310.
5. Epe C, Coati N, Stanneck D. Efficacy of the compound preparation imidacloprid 10%/permethrin 50% spot-on against ticks (*I. ricinus*, *R. sanguineus*) and fleas (*Ct. felis*) on dogs. *Parasitol Res* 2003; 90: 122-124.
6. Hellmann K, Knoppe T, Krieger K, Stanneck D. European multicenter field trial on the efficacy and safety of a topical formulation of imidacloprid and permethrin (Advantix) in dogs naturally infested with ticks and/or fleas. *Parasitol Res* 2003; 90: 125-126.
7. Mctier TL, Hair JA, Walstrom DJ, Thompson L. Efficacy and safety of topical administration of selamectin for treatment of ear mite infestation in rabbits. *J Am Vet Med Assoc* 2003; 223: 322-324.
8. Mehlhorn H, Schmahl G, Mencke N, Bach T. The effects of an imidacloprid and permethrin combination against developmental stages of *Ixodes ricinus* ticks. *Parasitol Res* 2003; 90: 119-121.
9. Miro G, Galvez R, Mateo M, Montoya A, Descalzo MA, Molina R. Evaluation of the efficacy of a topically administered combination of imidacloprid and permethrin against *Phlebotomus perniciosus* in dog. *Vet Parasitol* 2007; 143: 375-379.
10. Otranto D, Paradies P, Lia RP et al. Efficacy of a combination of 10% imidacloprid/50% permethrin for the prevention of leishmaniasis in kennelled dogs in an endemic area. *Vet Parasitol* 2007; 144: 270-278.
11. Pan B, Wang M, Xu F, Wang Y, Dong Y, Pan Z. Efficacy of an injectable formulation of eprinomectin against *Psoroptes cuniculi*, the ear mange mite in rabbits. *Vet Parasitol* 2006; 137: 386-390.
12. Pandey VS. Effect of ivermectin on the ear mange mite, *Psoroptes cuniculi*, of rabbits. *Br Vet J* 1989; 145: 54-56.
13. Paterson S. Skin diseases and treatments of rabbits. In: Paterson S. ed. *Skin Diseases of Exotic Pets*, Blackwell Science Ltd, Oxford 2006: 288-311.

## 세 마리 애완 토끼의 귀진드기 감염증에 imidacloprid와 permethrin 합제의 이용

김상훈 · 최경하 · 김덕환<sup>1</sup>

충남대학교 수의과대학

**요 약** : 토끼에서 귀진드기는 딱지와 가려움증을 동반하는 심한 외이염을 유발할 수 있다. 본 증례 보고에서는 귀진드기에 감염된 세 마리의 토끼에게 10% imidacloprid와 50% permethrin 합제를 체중에 관계없이 0.4 ml로 치료했다. 치료 1주 후 토끼들은 딱지와 성충, 충란없이 경미한 가려움증만 보였다. 치료 4주 후 토끼들에서 임상 증상이나 성충, 충란은 관찰되지 않았다. 모든 토끼들이 치료 8주 후 부작용없이 본 합제로 성공적으로 치료되었다. 본 증례 보고는 imidacloprid와 permethrin 합제가 애완 토끼의 귀진드기에 효과적이었다는 것을 보여준다.

**주요어** : 귀진드기, 토끼, imidacloprid, permethrin.