

# THE TREATMENT OF CANINE DEMODICOSIS WITH THE ORAL APPLICATION OF IVERMECTIN

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## Abstract

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## THE TREATMENT OF CANINE DEMODICOSIS WITH THE ORAL APPLICATION OF IVERMECTIN

Canine demodicosis was treated with Ivermectin (Ivomec®) given orally at a dosage of 0.6 mg/kg to seven dogs. Three of the dogs were from a city pound, the others were privately owned. Six dogs had generalized lesions and one had localized ones. A complete blood count and their biochemical profiles were monitored each month. After treatment, the dogs recovered and had no demodectic mange in the multiple skin scrapings. The duration of treatment was 5-9 weeks (mean= 6.7 weeks). No adverse drug effects were seen during treatment and all blood values remained within the normal range.

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**Keywords :** canine demodicosis, Ivermectin, oral application

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## บทคัดย่อ

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### การรักษาโรคจีเรื้อนขุมขนในสุนัขโดยการให้กินยาไอเวอร์เมคติน

สุนัขจำนวน 7 ตัวได้รับการรักษาโรคจีเรื้อนขุมขนในสุนัขโดยการให้กินไอเวอร์เมคติน (ไอโวเมค) ในขนาด 0.6 มก.ต่อน้ำหนักตัว 1 กิโลกรัม สุนัข 3 ตัวมีที่มาจากหน่วยควบคุมโรคพิษสุนัขบ้า สำนักอนามัย กรุงเทพมหานคร อีก 4 ตัวเป็นสุนัขที่มีเจ้าของ โดยสุนัข 6 ตัวเป็นจีเรื้อนขุมขนแบบกระจายทั่วตัว อีก 1 ตัวเป็นจีเรื้อนขุมขนแบบเฉพาะที่ หลังจากการรักษาสุนัขมีอาการดีขึ้น ตรวจไม่พบตัวไร ซึ่งใช้ระยะเวลาในการรักษา 5-9 สัปดาห์ (เฉลี่ย 6.7 สัปดาห์) ไม่พบผลข้างเคียงจากยาตลอดระยะเวลาที่สุนัขได้รับการรักษา ตรวจค่าทางโลหิตวิทยาและค่าชีวเคมีทุกๆ 4 สัปดาห์ ไม่พบความผิดปกติใดๆ

คำสำคัญ : โรคจีเรื้อนขุมขนในสุนัข ไอเวอร์เมคติน กิน

## Introduction

Demodicosis is one of the most common skin disease of dogs in all parts of the world, as well as in Thailand. *Demodex canis* lodges in the hair follicles, and the meibomian and sebaceous glands of the hosts. The mite may be found as a normal inhabitant on the skin of some dogs. In clinical demodicosis, all stage of the mite may be found in skin scrapings (Kwochka, 1993). In The United States, amitraz is the only drug that is approved to treat dogs with demodicosis. Because of the very low cure rate following the treatment, alternative drugs have been sought.

Ivermectin is well recognized for the treatment of several kinds of mange and nematode infestations in all animals. Oral applications using a

solution or paste are also available for the treatment of nematodes in other hosts, such as horses and sheep, with excellent results. The mode of action of this drug involves an inhibitory neurotransmitter, namely gamma-aminobutyric acid (GABA), which leads to paralysis and death of the parasites. Normal dosages of Ivermectin are 0.33 mg/kg in pigs and 0.2 mg/kg in cattle when given by subcutaneous injection. Such treatments have caused fatalities in dogs particularly in the Collie and other related breeds. Despite this, Ivermectin has been licensed just for heartworm prevention in dogs at an oral dosage of 5-7 µg/kg monthly.

Parenteral treatment of canine demodicosis with Ivermectin given in regular or in even higher dosages has been reported (Tanticharoenyos

and Tanticharoenyos, 1985; Yathiraj et al., 1991; Kwochka, 1993). Moreover, long term oral treatment of the disease with an Ivermectin injectable formulation has also been studied (Paradis and Laperrier, 1992; Medleau et al., 1995; Ristic et al., 1995; Ginel, 1996).

The purpose of this study was to determine the efficiency over different treatment period of an Ivermectin injectable formulation at a dosage of 0.6 mg/kg daily using it orally in cases of canine demodicosis.

### Materials and methods

**Dogs:** Privately owned and stray dogs with demodicosis were studied. Generalized demodicosis was defined if lesions involved at least 50% of the body. Localized demodicosis was defined when they involved less than 50% of the body.

**Treatment protocol:** The study was conducted in the form of a prospective trial. At the time of the initial examination, multiple skin scrapings were taken from each dog. Blood samples for a haematogram and serum biochemistry analyses were obtained from each dog. All dogs were treated orally with 1% Ivermectin injectable formulation (Ivomec®) given orally at a dosage of 0.6 mg/kg. Antibiotics were administered concurrently to dogs with pyoderma or in dogs that showed other clinical lesions such as abscesses. No other parasitocidal agents were given topically or systemically.

**Monitoring and treatment:** A physical examination and multiple skin scrapings from at least 3 fields were performed weekly. Skin scrapings were taken from approximately the same site on every

examination. If any mites, dead or alive, were seen, treatment was continued. If no mites were seen, the treatment was continued for 2 weeks and then stopped. The monitoring of mites continued weekly for 2-6 months following the end of treatment. Complete blood counts and biochemical profiles were monitored monthly.

**Data analysis:** Treatment was considered successful if mites were not seen in skin scrapings collected at the time of the examination.

### Results

Seven mongrels were took part into the trial. Four of them were privately owned and three were stray dogs from the dogs city pound. Six dogs were defined as having generalized demodicosis. One dog was defined as suffering from localized demodicosis. The status of all dogs is depicted in Table 1.

Four weeks after treatment, all dogs showed an improvement in clinical signs and number of mites decreased. The treatment period varied from 5-9 weeks with an average of 6.7 weeks (table 2). Two dogs (dog number 2 and 3) were still showing clinical sign of dermatitis though no mites were found in multiple scrapings. No obvious adverse drug effects were seen in this study. There was no change in blood biochemical values nor the hemograms.

One of the stray dogs that had oral abscesses and anorexia was euthanized because of the complications, even though the clinical signs of demodicosis were cured. Skin biopsies of the euthanized dog were taken and the results of histopathology study showed hyperkeratosis changes but no mites.

**Table 1.** Status of dogs

No.	Status	Ages	Sex	Type of disease	Remark
1	Stray dog	-	M	Generalized	-
2	Stray dog	-	M	Generalized	-
3	Owned dog	-	Fs	Generalized	-
4	Owned dog	10 yr	F	Generalized	-
5	Owned dog	7 yr	F	Generalized	-
6	Stray dog	-	F	Generalized	Oral abscess, lethargy, depression
7	Owned dog	6 mo	F	Localized	-

*M = male, F = female, Fs = female spayed, - = no information*

**Table 2.** Results of oral administration of Ivermectin to 7 dogs with demodicosis

No.	Duration of treatment (week)	Observation period after absent of mite (months)	Antibacterial drugs	Outcome
1	5	6	Sulfadiazine	Cure
2	5	6	Sulfadiazine	Relapse of clinical signs without mites being found
3	9	2	Cephalexin	Relapse of clinical signs without mites being found
4	8	3	Amoxicillin	Cure
5	8	3	-	Cure
6	5	-	-	No mites were found but the dog was euthanized because of oral abscess and lethargy. A skin biopsy was taken for histopathological investigation
7	7	3	-	Cure

## Discussion

The treatment of severe generalized canine demodicosis is known to be a tremendous problem for small animal practitioners. Several drugs and control methods have been tried without satisfactory results. The pathogenesis of the disease is not completely understood. Some breeds are more resistant to the disease than others. An autosomal recessive mode of inheritance may be involved in sensitivity to or resistance to the disease (Henfrey, 1990). Reduced number and impaired function of T-lymphocytes may be related to increased pathogenesis of the disease (Scott et al., 1974). Immunosuppressive substances such as anti-lymphocyte serum given by injection or high doses of corticosteroid may enhance sensitivity to the disease (Owen, 1972). Liver disease, endocrine gland disorders including hormone fluctuation during the estrous cycle may be involved in the diseases development (Kwochka, 1993). Puppies can be infested by direct contact with bitches after parturition. Intrauterine transmission is not believed to occur (Scott et al., 1974).

Canine demodicosis can be either localized or generalized. The localized type commonly has lesions on the skin of the face and head especially in the periorbital and perioral region of young dogs. These lesions may not be severe. The dogs show alopecia and erythema with a limited degree of inflammation. Occasionally, lesions include scaling and hyperpigmentation with minor pruritus. In addition, secondary infections such as pustules and papules may be seen (Kwochka, 1993). More than 90% of dogs suffering from localized demodicosis may get better without treatment. The others may develop the generalized disease whose lesions include severe erythema, alopecia and pustules. Oily seborrhea, scaling, hyperkeratinization, loss of appetite, depression and fever may also present (Medleau, 1994), and bacteria such as *Staphylococcus spp.*, *Pseudomonas aeruginosa* and *Proteus*

*mirabilis* are not uncommonly found. Demodicosis in young animals (3-5 months old) can be classified as a juvenile onset while that occurred in older dogs is called an adult onset (Lamerie, 1996).

Treatment of generalized demodicosis is difficult. Dipping in 0.025% amitraz solution biweekly is the only treatment approved by Food and Drug Administration (FDA) in USA. (Medleau and Rakich, 1991). This formamidine insecticide inhibits monoamine oxidase and prostaglandin synthesis. Usually, amitraz has low toxicity in dogs and cats, however somnolence, lethargy, depression and anorexia can be observed as common side effects. Sirinarumit and his colleagues (1991) used amitraz at 0.025% for weekly dipping to treat canine demodicosis with 100% clinical recovery although relapse occurred in 2 dogs. Surahat and coworkers (1992) performed a similar treatment with an acaricide biweekly but the results were relatively unfavorable. Resistance of canine demodicosis to amitraz had been reported (Paradis and Laperriere, 1992).

The effects of Ivermectin were studied in various dose regimes. Medleau and coworkers (1996) looked at a dosage of 0.4 mg/kg given once daily. The study was successful in only 5 out of 12 dogs (48%), and the duration of the treatment averaged 15 weeks. Other studies, at a dosage of 0.6 mg/kg given once daily, were more effective against generalized demodicosis in 10 out of 12 dogs (83%) (Ristic et al., 1995). A result that agreed with this study. It could be suggested that Ivermectin at a dosage of 0.6 mg/kg daily is more effective than 0.4 mg/kg daily in treating generalized demodicosis.

Ivermectin has a wide safety margin in all animals. Almost all kinds of dogs, except Collies and related breeds, are tolerant to a very high dose of Ivermectin (Pullium and Preston, 1989). Adverse effects that could be found from using Ivermectin includes tremor, ataxia, mydriasis, stupor, coma and death. To avoid any adverse effects because of

individual susceptibility, a low dosage of 0.1 mg/kg is recommended to start the treatment, gradually increasing to 0.6 mg/kg. In complicated cases, additional therapy with some effective antibacterial drugs is recommended. After the absence of mites in multiple scrapings and/or after a complete clinical recovery, Ivermectin treatment may be extended for several weeks or even months to prevent a relapse.

From the results of this study it can be concluded that oral treatment with Ivermectin injectable formulation may be a good alternative to dipping in 0.25% amitraz solution when dealing with adult onset, generalized demodicosis. Daily oral treatment of canine demodicosis with 0.6 mg/kg. Ivermectin gave satisfactory results as indicated by the absence of mites from multiple skin scrapings. The treatment period was between 5-9 weeks with an average of 6.7 weeks. Obvious adverse drug effects were not observed during the experiment nor were there any clinical signs unfavorable or haematological problems.

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