

Terbinafine & *Malassezia* spp Dermatitis

Long-term management of *Malassezia* spp dermatitis, a common pruritic skin disease in dogs, is focused on treating the underlying trigger and on topical therapy strategies. Acute episodes are commonly treated with oral antifungals. Terbinafine hydrochloride (TBF) does not use the fungal cytochrome P450 pathway, which may make it less vulnerable to drug interactions and side effects as compared with azole drugs. Because TBF is available as a low-cost generic formulation, it is an attractive alternative to azoles. In humans, TBF has been shown to concentrate and persist in skin.

In this study, healthy dogs ($n = 10$) were given 30 mg/kg PO q24h of a generic TBF formulation for 21 days. TBF concentrations were measured in serum, sebum, and stratum corneum of the paw and thorax before and 3 hours after TBF administration on multiple days from day 1 to 35. Serum concentrations were significantly higher than were paw stratum corneum, thorax stratum corneum, and sebum concentrations. TBF did not accumulate or persist in canine stratum corneum or sebum as compared with serum. The mean maximum concentration for paw and thorax stratum corneum and for sebum barely exceeded the published *Malassezia* spp minimum inhibitory concentration (MIC₉₀) of 0.25 µg/mL and never reached it in some subjects. Although multiple dogs had clinical laboratory values outside of the normal range, none of these values were considered clinically significant. Results indicated that, although well-tolerated, oral TBF doses >30 mg/kg q24h may be needed for efficacy in the treatment of canine *Malassezia* spp dermatitis, and further characterization of the *Malassezia* spp MIC and TBF efficacy would be useful.

Commentary

The major takeaway from this article is to avoid prescribing terbinafine for *Malassezia* spp dermatitis treatment. Terbinafine has been an attractive low-cost alternative to other azoles for treating *Malassezia* spp overgrowth, especially because it is part of many \$4 and \$12 prescription plans. In this commentator's experience, clinical response in dogs to terbinafine was unimpressive as compared with ketoconazole. This was somewhat perplexing because this drug was effective for treating dermatophytosis. The findings in this study helped explain why. This is yet another example of why it is important to design not only species-specific pharmacokinetic studies but also organ-specific studies.—Karen A. Moriello, DVM, DACVD

Source

Gimmler JR, White AG, Kennis RA, Cruz-Espindola C, Boothe DM. Determining canine skin concentrations of terbinafine to guide the treatment of *Malassezia* dermatitis. *Vet Dermatol*. 2015;26(6):411-416, e95-e96.

Oral TBF doses >30 mg/kg q24h may be needed for efficacy in the treatment of canine *Malassezia* spp dermatitis.

INTERCEPTOR[®] PLUS (milbemycin oxime/praziquantel)

Caution

Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

Before using this product, please consult the product insert, a summary of which follows:

Indications

INTERCEPTOR PLUS is indicated for the prevention of heartworm disease caused by *Dirofilaria immitis*; and for the treatment and control of adult roundworm (*Toxocara canis*, *Toxascaris leonina*), adult hookworm (*Ancylostoma caninum*), adult whipworm (*Trichuris vulpis*), and adult tapeworm (*Taenia pisiformis*, *Echinococcus multilocularis*) and *Echinococcus granulosus* infections in dogs and puppies two pounds of body weight or greater and six weeks of age and older.

Dosage and Administration

INTERCEPTOR PLUS should be administered orally, once every month, at the minimum dosage of 0.23 mg/lb (0.5 mg/kg) milbemycin oxime, and 2.28 mg/lb (5 mg/kg) praziquantel. For heartworm prevention, give once monthly for at least 6 months after exposure to mosquitoes (see **EFFECTIVENESS**).

See product insert for complete dosing and administration information.

Contraindications

There are no known contraindications to the use of INTERCEPTOR PLUS.

Warnings

Not for use in humans. Keep this and all drugs out of the reach of children.

Precautions

Treatment with fewer than 6 monthly doses after the last exposure to mosquitoes may not provide complete heartworm prevention (see **EFFECTIVENESS**).

Prior to administration of INTERCEPTOR PLUS, dogs should be tested for existing heartworm infections. At the discretion of the veterinarian, infected dogs should be treated to remove adult heartworms. INTERCEPTOR PLUS is not effective against adult *D. immitis*.

Mild, transient hypersensitivity reactions, such as labored breathing, vomiting, hypersalivation, and lethargy, have been noted in some dogs treated with milbemycin oxime carrying a high number of circulating microfilariae. These reactions are presumably caused by release of protein from dead or dying microfilariae.

Do not use in puppies less than six weeks of age.

Do not use in dogs or puppies less than two pounds of body weight.

The safety of INTERCEPTOR PLUS has not been evaluated in dogs used for breeding or in lactating females. Studies have been performed with milbemycin oxime alone.

Adverse Reactions

The following adverse reactions have been reported in dogs after administration of milbemycin oxime or praziquantel: vomiting, diarrhea, depression/lethargy, ataxia, anorexia, convulsions, weakness, and salivation.

To report suspected adverse drug events, contact Elanco US Inc. at 1-888-545-5973 or the FDA at 1-888-FDA-VETS.

For technical assistance call Elanco US Inc. at 1-888-545-5973.

Information for Owner or Person Treating Animal:

Echinococcus multilocularis and *Echinococcus granulosus* are tapeworms found in wild canids and domestic dogs. *E. multilocularis* and *E. granulosus* can infect humans and cause serious disease (alveolar hydatid disease and hydatid disease, respectively). Owners of dogs living in areas where *E. multilocularis* or *E. granulosus* are endemic should be instructed on how to minimize their risk of exposure to these parasites, as well as their dog's risk of exposure. Although INTERCEPTOR PLUS was 100% effective in laboratory studies in dogs against *E. multilocularis* and *E. granulosus*, no studies have been conducted to show that the use of this product will decrease the incidence of alveolar hydatid disease or hydatid disease in humans. Because the prepatent period for *E. multilocularis* may be as short as 26 days, dogs treated at the labeled monthly intervals may become reinfected and shed eggs between treatments.

Effectiveness

Heartworm Prevention:

In a well-controlled laboratory study, INTERCEPTOR PLUS was 100% effective against induced heartworm infections when administered once monthly for 6 consecutive months. In well-controlled laboratory studies, neither one dose nor two consecutive doses of INTERCEPTOR PLUS provided 100% effectiveness against induced heartworm infections.

Intestinal Nematodes and Cestodes Treatment and Control:

Elimination of the adult stage of hookworm (*Ancylostoma caninum*), roundworm (*Toxocara canis*, *Toxascaris leonina*), whipworm (*Trichuris vulpis*) and tapeworm (*Echinococcus multilocularis*, *Echinococcus granulosus*, *Taenia pisiformis*) infections in dogs was demonstrated in well-controlled laboratory studies.

Palatability

In a field study of 115 dogs offered INTERCEPTOR PLUS, 108 dogs (94.0%) accepted the product when offered from the hand as if a treat, 1 dog (0.9%) accepted it from the bowl with food, 2 dogs (1.7%) accepted it when it was placed in the dog's mouth, and 4 dogs (3.5%) refused it.

Storage Information

Store at room temperature, between 59° and 77°F (15-25°C).

How Supplied

INTERCEPTOR PLUS is available in four strengths, formulated according to the weight of the dog. Each strength is available in color-coded packages of six chewable tablets each. The tablets containing 2.3 mg milbemycin oxime/22.8 mg praziquantel or 5.75 mg milbemycin oxime/57 mg praziquantel are also available in color coded packages of one chewable tablet each.

Manufactured for: Elanco US Inc.
Greenfield, IN 46140, USA
Product of Japan

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