

TIPS, TRICKS, and UPDATES ON THE DIAGNOSIS AND MANAGEMENT OF DERMATOPHYTOSIS

Douglas J. DeBoer, DVM

School of Veterinary Medicine, University of Wisconsin, Madison, Wisconsin USA

Hitting the Key Points: The Fungus

- Most infections are still with *Microsporum canis*, especially in cats
- Feline infections with other fungal species such as *M. gypseum* and *Trichophyton mentagrophytes* appear to be on the rise, especially in animal shelters
- Infections with unusual species such as *M. persicolor* have been reported and may be increasing, especially in some areas of the world
- Several factors are required for development of infection, beyond just the mere presence of the fungus. Host factors are important, such as youth (kittens, puppies), debilitating disease, compromised immune status (from disease or drugs), poor nutrition, or stress. These factors are supremely important when working with multiple-cat facilities.
- **KEY TAKEAWAYS:** *be on the lookout for non-M.canis infections, though fortunately these are easy to treat. Always remember to consider that infections require more than just the presence of the fungus.*

Hitting the Key Points: Diagnosis

- Dermatophytosis has many different clinical presentations and could be considered a differential diagnosis for almost any skin disease. This is particularly true in the cat.
- Aberrant host factors can lead to development of a kerion reaction, or to dermatophytic pseudomycetoma.
- Wood's lamp examination is a reasonable screen, but is NOT definitive. It may find its best use when working with an infected cattery or animal shelter, with a fluorescing strain involved.
- Fungal culture on DTM is the best diagnostic method, but must be done properly
 - Toothbrush collection and inoculation
 - Incubation at warm room temperature (28 C)
 - White colony with red color change at same time
 - Microscopic identification of colony
- Newer PCR based methods may become more widely available, but must be interpreted very cautiously because PCR will be positive on live OR dead fungus!
- **KEY TAKEAWAYS:** *dermatophytosis can look like anything, but fungal culture is still the gold standard for diagnosis.*

Hitting the Key Points: Treatment

- In most healthy animals, dermatophytosis is a self-curing disease and eventually (in perhaps 10-16 weeks) will spontaneously resolve. Proper treatment can, however, accelerate recovery and thereby help to minimize spread.
- The best treatment protocol is a combination of 3 approaches: **topical treatment** to kill infective material on the haircoat and skin, and prevent its dissemination into the environment; **systemic treatment** to shorten the disease course in the individual animal; and **environmental treatment** to help prevent recurrence of infection or spread to other animals or people in the household.
- When you use topical treatment, whole body treatment (rinsing or shampooing) is the best method, and should be performed twice weekly. Currently favored topical whole-body rinses for dermatophytosis include lime sulfur solution (all brands appear equivalent); this chemical is very safe, but the odor is very bad.
- Miconazole or ketoconazole plus chlorhexidine are synergistic, and shampoos containing these ingredients are useful in cats as an adjunct treatment to systemic therapy. In one study, cats treated with Malaseb® shampoo + griseofulvin recovered *visually* at about the same rate as cats treated with griseofulvin alone. However, treatment with the combination of shampoo and griseofulvin achieved *negative fungal cultures* much more rapidly than treatment with griseofulvin alone.
- Clipping of hair is “going out of fashion.” Very small (invisible) trauma from the clipper blade may help to spread the infection on the cat’s haircoat.
- Ketoconazole as a systemic antifungal is best reserved for infections in dogs, particularly *Trichophyton*; use at 5-10 mg/kg/day. Studies suggest a high prevalence (~25%) of hepatotoxicity in cats, and occasionally at higher doses in dogs.
- Itraconazole has become the systemic drug of choice for treating ringworm. Expense is a factor, so its use is mostly limited to cats or small dogs. Itraconazole accumulates and persists in skin following oral administration, such that a pulse-dosing schedule is rational, is as effective as daily continuous dosing for most infections, and saves money over daily dosing. The manufacturer’s recommended pulse-dose schedule in cats is 5 mg/kg once per day, orally, on an every-other-week schedule. Treatment is generally continued for three “pulses” of one week on, one week off. There are anecdotal reports of some cats’ infections not responding to the manufacturer protocol, and requiring a higher dose. Thus, if clinical response is not occurring in a cat within the first few weeks of treatment, raising the dose to 10 mg/kg once daily is recommended (and safe).
- Terbinafine, in initial studies, also seems to be effective in some situations. This drug is much less studied, but is currently enjoying great popularity because in late 2008 it became available as a very cheap generic in the USA. In one report, cats with *M. canis* “apparently resistant” to itraconazole (though it’s uncertain if this is really occurs, and how often) were successfully treated with terbinafine at 10-30 mg/kg once daily. Cats treated with a bit higher dose cure significantly faster, and 30-40 mg/kg/d is thus the recommended dose for cats – anywhere in this range is fine, depending on the tablet size. This dose is much higher than

human doses, due to the cat's different metabolism of the drug. There are two adverse effects commonly reported (~1/3 of cats?): malaise and elevated liver enzymes, though the two do not necessarily occur together. Monitor liver enzymes; this drug may elevate ALT in cats, though no clinical toxicity is necessarily seen if ALT is up.

- There are definite reports of failure of individual cats to clinically respond to azole drugs, including itraconazole. Whether this is true resistance of the organism, or some host factor related to poor bioavailability, is not known. In such cases, terbinafine has been clearly successful and is recommended.
- Studies over the past several years have clearly demonstrated that many disinfectants sold and labeled as effective for killing dermatophytes in the household or veterinary clinic are, in fact, not practically effective for this purpose.
- Our best current recommendations for environmental disinfection are bleach (1:100 or 1 oz/gallon) or accelerated hydrogen peroxide-based products.
- How extensively to recommend disinfection? In a typical household with one or a few cats, it may make sense to do a thorough general vacuuming and cleaning, and perhaps wipe down any "cat-intensive" areas with disinfectant if possible. This will mechanically remove most of the contamination, and the remaining spores probably don't matter practically AS LONG AS the owner does not anticipate that new children, new kittens or puppies, or immunosuppressed individuals will be admitted into the house.
- This situation changes ENTIRELY when discussing control in a cattery or animal shelter, where environmental disinfection is supremely important, and a common reason for failure of eradication.
- A great source of information for helping with cattery or animal shelter eradication can be found at: <http://www.giveshelter.org> under "Maddie's Felines In Treatment Center"
- **KEY TAKEAWAYS for therapy:**
 - *Always use topical and systemic treatment.*
 - *Use lime-sulfur or azole-chlorhexidine, with little or no clipping.*
 - *Use itraconazole unless cost-prohibitive; otherwise use terbinafine (dog, cat) or ketoconazole (dog).*
 - *Environmental treatment is crucial in a cattery or shelter; less important in households.*