Fungal Infection of the Skin, Hair, or Nails
(Dermatophytosis)

Basics

OVERVIEW
• “Dermatophytosis” is the medical term for a fungal infection affecting the skin, hair, and/or nails (claws)
• Most commonly isolated fungal organisms are *Microsporum canis*, *Trichophyton mentagrophytes*, and *Microsporum gypseum*

SIGNALMENT/DESCRIPTION OF PET
Species
• Dogs
• Cats
Breed Predilections
• In cats, infections are seen more commonly in longhaired breeds
Mean Age and Range
• Clinical signs are seen more commonly in young and older pets

SIGNS/OBSERVED CHANGES IN THE PET
• Pet may be an inapparent carrier; a “carrier” is an animal in which no signs of disease are present, but harbors the disease-causing fungus and can transmit it to other animals or people
• Hair loss (known as “alopecia”), which may be patchy or circular; the classic sign of circular hair loss is more common in cats than in dogs
• Poor hair coat
• Scales (accumulations of surface skin cells, such as seen in dandruff); reddened skin (known as “erythema”); darkened skin (known as “hyperpigmentation”); and itchiness (known as “pruritus”) are variable
• Inflammation of the claw folds (known as “paronychia”), nodular lesions (known as “granulomatous lesions”), or raised nodular lesions that frequently ooze (known as “kerions”) also may be seen

CAUSES
• *Microsporum canis* is the most common cause of dermatophytosis in cats
• In dogs, the three most common causes are *Microsporum canis*, *Microsporum gypseum*, and *Trichophyton mentagrophytes*; the incidence of each fungus varies geographically
• Less common species can cause fungal infection of the skin, hair, and/or nails (dermatophytosis)

RISK FACTORS
• Diseases (such as feline leukemia virus [FeLV] or feline immunodeficiency virus [FIV]) or medications (such as steroids) that decrease the ability of the body to develop a normal immune response (known as “immunocompromising diseases” or “immunosuppressive medications,” respectively) increase the likelihood that a pet will develop a fungal infection of the skin, hair, and/or nails (dermatophytosis) and increase the potential for a more severe infection
• FIV increased the likelihood of developing a fungal infection three-fold
• High population density of animals (for example, in a cattery or animal shelter), poor nutrition, poor management practices, and lack of adequate quarantine period increase risk of infection

**Treatment**

**HEALTH CARE**

• Most pets are treated as outpatients
• Quarantine procedures should be considered due to the infective and zoonotic nature of the disease; “zoonotic diseases” are diseases that can be passed from animals to people
• The use of an Elizabethan collar, particularly in cats, is recommended to prevent ingestion of antifungal medications applied to the skin
• A “ringworm vaccine” was available, but apparently it was only of benefit in decreasing signs, which might lead to development of a carrier (an animal with no signs of disease, but which harbors the disease-causing fungus and can transmit it to other animals or people); the vaccine is no longer available in the United States

**DIET**

• Depending on the medication used in treatment, the diet should remain normal
• If griseofulvin (an antifungal medication) is used as treatment, a fatty meal improves absorption following administration of the drug by mouth
• Adding tomato juice to the diet to acidify the food helps absorption of ketoconazole (an antifungal medication)

**Medications**

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

• Griseofulvin (an antifungal medication) has been prescribed most commonly for the treatment of dermatophytosis; griseofulvin's absorption is enhanced by dividing the dose twice per day or giving it with a fatty meal; griseofulvin does have side effects, some of which are serious—discuss potential side effects with your pet's veterinarian
• Ketoconazole (an antifungal medication) has been used in the treatment of dermatophytosis; treatment usually requires 4–8 weeks; side effects (such as lack of appetite, vomiting, and liver disease) have been seen—discuss potential side effects with your pet's veterinarian; not recommended for treating cats
• Itraconazole (an antifungal medication) is similar to ketoconazole, but typically has fewer side effects and is more effective, but it is expensive; treatment usually requires 4–8 weeks
• Clipping of the hair coat and application of antifungal medications directly to the skin (known as “topical therapy”) may be used in treatment; recommended use in conjunction with antifungal medications administered by mouth (such as griseofulvin or ketoconazole); topical treatments may help prevent environmental contamination; topical treatments often are associated with initial worsening of signs; topical treatments include lime sulfur (1:16 dilution or 8 oz. per gallon of water), enilconazole and miconazole (with or without chlorhexidine); eniconazole is not available in the United States for household use
• Lufenuron, a chitin-synthesis inhibitor used in flea control, was once a popular treatment consideration, but studies have shown it is not effective; Fluconazole (an antifungal drug) is an alternative treatment for which effectiveness has not been well documented in studies; less expensive than itraconazole
• Terbenafine—may be helpful in pets in which the fungal infection (dermatophytosis) does not respond to the azole medications

**Follow-Up Care**
**PATIENT MONITORING**

- Fungal (dermatophyte) culture is the only means of truly monitoring response to treatment
- Many pets will improve clinically, but remain fungal culture positive
- It is advisable to repeat fungal cultures toward the end of treatment and continue treatment until at least one culture result is negative
- In resistant cases, fungal cultures may be repeated on a weekly basis and treatment continued until 2–3 consecutive negative results are obtained
- Complete blood counts should be performed weekly or biweekly for pets receiving griseofulvin
- Bloodwork to monitor liver changes may be indicated for pets receiving ketoconazole or itraconazole

**PREVENTIONS AND AVOIDANCE**

- The use of a quarantine period and fungal (dermatophyte) cultures of all pets entering the household are necessary to prevent reinfection from inapparent carriers; a “carrier” is an animal in which no signs of disease are present, but harbors the disease-causing fungus and can transmit it to other animals or people
- The possibility of rodents aiding in the spread of the disease should be considered
- Treatment of exposed pets can be considered to prevent development of clinical signs

**POSSIBLE COMPLICATIONS**

- Falsely negative fungal (dermatophyte) cultures complicate management of this disease

**EXPECTED COURSE AND PROGNOSIS**

- Many pets will “self-clear” a fungal infection of the skin, hair, and/or nails (dermatophytosis) over a period of a few months
- Treatment hastens clinical cure and helps reduce environmental contamination
- Some infections, particularly in longhaired cats or multipet homes or facilities, can be very persistent

**Key Points**

- Many dogs and shorthaired cats (in a single-cat environment) will undergo spontaneous remission
- Longhaired pets should be clipped to reduce environmental contamination by the fungus
- The treatment of fungal infection of the skin, hair, and/or nails (dermatophytosis) can be frustrating and expensive, especially in multipet households or facilities or in recurrent cases
- Environmental treatment is important, especially in recurrent cases; dilute bleach is a practical and relatively effective means of providing environmental decontamination; however, this dilution of bleach will bleach various household materials—discuss the use of bleach in the environment and the recommended dilution with your pet’s veterinarian
- In a multipet environment or cattery situation, treatment and control of this disease can be very complicated
- Dermatophytosis is a zoonotic disease; “zoonotic diseases” are diseases that can be passed from animals to people
- If a person in contact with a dog or cat develops skin lesions, he or she should seek medical attention