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Ringworm in Cats

Ringworm is a skin disease caused by a fungus (plural: fungi). Because the lesions are often circular, ringworm was once thought to be caused by a worm curling up in the tissue. However, ringworm has nothing to do with any type of worm.

Ringworm is also known as *dermatophytosis*. There are four species of fungi that can cause dermatophytosis in cats; however, it is most often caused by the organism called *Microsporum canis*. The *Microsporum canis* organism is so well adapted to cats that up to 20% of cats are thought to be asymptomatic carriers, meaning they have the organism but show no outward signs.

Ringworm is actually an infection of the dead layer of the skin, hair, and nails. The organism is able to utilize this dead tissue (keratin) in the skin as a source of nutrition.

Contributing Factors

Genetic and environmental influences play an important role in feline ringworm infection. A significant amount of research remains to be done on this disorder. It does appear that Himalayan and Persian cats are affected most frequently. In catteries, ringworm can be hard to control because of the numbers of animals involved.

Clinical Signs

The fungi live in hair follicles. As the organism invades the hair shafts and they weaken, hairs break off at the skin line. Patches of hair loss tend to be round; however, as the fungus multiplies, the lesions may become irregularly shaped and spread over the cat's body. These patches may be associated with scaling and crusting of the skin. The lesions are sometimes pruritic (itchy) but this is not a consistent finding.

The incubation period is 10-12 days. This means that the exposure to the fungus and establishment of infection occurs 10-12 days before any lesions occur.

Diagnosis

Feline ringworm can be diagnosed by four different methods. In some cases, more than one technique is used.

1. Identification of the typical "ringworm" lesions on the skin. This is the least accurate method.
2. Examination of the scales and hair under the microscope. Some of the fungal elements, such as spores, can be visualized with this technique.
3. Fluorescence of infected hairs under a special light. This is a screening test that is useful because *Microsporum canis* will sometimes fluoresce as a bright apple green under ultraviolet light. However, failure to fluoresce does not eliminate ringworm as a potential diagnosis.

4. Culture of the hair for the fungus. This method is the most accurate way to diagnose feline ringworm. After some hair is plucked from a lesion on the skin, it is placed on a special gel (culture media) to watch for growth of the fungus. Also, the color of the gel will change from yellow to red as the fungus grows. These cultures are checked daily. Most cats with ringworm will have a positive culture within 10 days, but in rare cases, growth may not occur for 14-21 days.

Transmission

Transmission occurs by direct contact between infected and non-infected individuals. It may be passed from dogs to cats and visa versa. It may also be passed from dogs or cats to people and visa versa. If a child has ringworm, he or she may have gotten it from the pet or from another child at school. Adult humans are relatively resistant to infection unless there is a break in the skin or there is suppression of the immune system (AIDS, chemotherapy, etc). Children are quite susceptible. Consult with your family physician if any family member develops suspicious skin lesions.

Transmission may also occur from the infected environment. The fungal spores may live in bedding or carpet for several months. They may be killed with a dilution of chlorine bleach and water (1 cup of chlorine bleach in a gallon of water) where it is feasible to use it.

Treatment

There are several methods for treating ringworm. The specific method(s) chosen for your cat will depend on the severity of the infection, how many pets are involved, presence of children in the household, and how difficult it will be to disinfect your cat's environment.

1. Griseofulvin. This is a tablet that is concentrated deep in the hair follicles where it can reach the site of active fungal growth. Griseofulvin should be given daily. Cats with active lesions should receive the tablets for a minimum of 30 days. At that time, the cat should be rechecked to be sure the infection is adequately treated.

These tablets are not absorbed from the stomach unless there is fat in the stomach at the time they are given. This can be accomplished by feeding a high fat diet, such as a rich canned cat food or a small amount of fat trimmings from meats (often available at the meat departments of local grocery stores upon request of the butcher) or by allowing the cat to drink some rich cream. *This is the most important part of the treatment.* If you are not successful in giving the tablets, please call us for help.

Griseofulvin is the only drug approved for systemic (oral) treatment of feline ringworm. It is very effective and has successfully treated the vast majority of affected cats. However, it does have some potentially significant side effects.

a. Vomiting and diarrhea are the most common side effects. These signs may abate if the dosage is divided over two or three treatments in a day.

b. It is a potent teratogen, meaning it can cause birth defects. As such, it should not be used to treat pregnant cats or cats which might become pregnant during the treatment period. It can potentially cause abnormalities in the breeding tomcat, as well, so may be best avoided for all reproductively active cats. There are no reported effects for queens who become pregnant after griseofulvin therapy is completed.

c. Suppression of the bone marrow is a rare, but potentially fatal, complication of griseofulvin therapy. Toxicity cannot be predicted and may appear without warning; however it is most likely to occur in cats infected with the Feline Immunodeficiency Virus ("Feline AIDS Virus")

2. Itraconazole is one of the newer drugs being used to treat ringworm. It is not approved for use in cats, but is generally considered safe and effective. The high cost of the drug is prohibitive in some cases. Some reports indicate that it is equal or possibly superior to griseofulvin in achieving a cure. It may offer the advantage of preventing fungal spores from adhering to the dead layer of the skin. For cats that cannot tolerate griseofulvin or are not cured by it, itraconazole is a good choice.

3. Baths using an antifungal shampoo. A bath should be given 3 times on an every other day schedule. Bathe exposed but unaffected pets once. These baths are important in getting the spores off the hairs so they do not drop into the environment and result in re-exposure. A lather should be formed and left on for 5-10 minutes before rinsing. Be aware that antifungal shampoos alone cannot be expected to provide a cure, but are useful in the overall treatment plan.

4. Lime Sulfur Dip. This should be done twice weekly for the first two weeks, then once weekly for 4-6 weeks. Lime sulfur dip should also be applied to other pets (dogs or cats) in the household to prevent them from being affected. If they develop ringworm lesions, they should begin on griseofulvin. You should wear gloves when applying the dip and should remove jewelry before you start. Lime sulfur can change the color of some jewelry. This is an effective form of treatment, but the dip has an objectionable odor (rotten eggs).

5. Ringworm vaccine. This vaccine helps the cat to develop immunity to the fungus. Other products are still used with it, but its use will hasten recovery. This is especially important if several other pets or children are exposed. Some cats are reported to develop hair loss and sterile abscesses at the injection site.

6. Shaving of the cat's hair. A total clipdown of the cat used to be considered standard practice. In some cases, this may still be advantageous; however, it may not be necessary in every case. Some studies have suggested that clipping may cause microscopic nicks in the skin and serve to further inoculate ringworm into the skin. Also, clipper blades can spread the fungus between cats. Clipping is most likely to be of help with longhaired cats and in households where more than one cat is infected.

Treatment will not produce immediate results and the areas of hair loss may get larger before they begin to get smaller. Within 1-2 weeks, the hair loss should stop, there should be no new areas of hair loss, and the crusty appearance of the skin should diminish. If any of these do not occur within two weeks, we should see your cat again.

Infected pets remain contagious for about 3 weeks if aggressive treatment is used. Contagion will last longer if only minimal measures are taken or if you are not faithful with the prescribed approach. Minimizing exposure to other dogs or cats and to your family members is recommended during this period.

When treatment is completed, ringworm should be cured. Although a carrier state can exist, this usually occurs because treatment is not long enough or aggressive enough or because there is some underlying disease compromising the immune system.