

Ringworm

ETIOLOGY AND PATHOGENESIS

Dermatophytosis (ringworm) is an infection of the skin, hair, or nail with fungi of the genera *Microsporum*, *Trichophyton* or *Epidermophyton*. The most common cause in cats is *M. canis*; in dogs the most common causes are *M. canis* and *M. gypseum*. Other less frequent species include *T. mentagrophytes*, *M. persicolor*, *T. erinacei*, *M. verrucosum*, *M. equinum* and *T. equinum*.

Isolation rates from healthy cats vary and probably reflect differences in environment and management. Ringworm is most likely to be isolated from colonies of cats, but rarely found in those that have never been exposed to infection.

Infection is by contact with infected animals or contaminated environments and the incubation period varies from one to three weeks. The fungus infects growing hairs and living skin. Factors that influence the outcome of infection include a young age or the elderly, immunosuppression, high temperature and humidity, and skin trauma. *M. canis* is more common in Persian cats and Yorkshire Terriers (possibly due to ineffective grooming). Most cats inoculated with spores do not develop ringworm as their grooming behaviour efficiently removes the spores⁹.

M. canis tends to induce a mild, self-limiting infection and a low-grade immune response, but animal are not protected from reinfection. Lesions typically resolve in 2-3 months, although animals may remain infective for several weeks longer. Infective fungal spores are readily shed into the environment and can remain viable for 18 months. Control of contamination is of great importance in the management of dermatophytosis.

CLINICAL FEATURES

Classic signs include focal areas of hair loss and scaling, typically on the face, head and feet. Other clinical signs include inflammation and or rupture of the hair follicles, feline acne, infection of the nails, thick bumps or swelling of the skin and moist lesions. Pruritus and inflammation is usually minimal, but occasionally pruritic, pustular or crusting forms may mimic allergies, parasites, miliary dermatitis, bacterial infection or pemphigus foliaceus. Ringworm mycetoma is a swelling of the skin with tracts draining a blood tinged fluid. *Trichophyton mentagrophytes* typically causes more severe redness of the skin, hair loss, crusting and swelling in the skin of the face and feet,



especially in small terrier breeds.

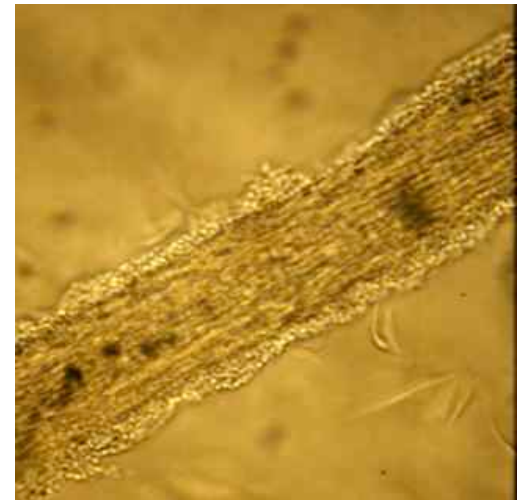
DIFFERENTIAL DIAGNOSES

Because the clinical presentation can be so variable ringworm should be considered in almost any animal, but especially cats, that present with: focal to multifocal hair loss, scaling and crusting; diffuse hair loss, greasiness of the skin.



DIAGNOSTIC TESTS

Diagnosis relies on culture of hair and scale collected by scraping, plucking or using , grooming or tooth brushes. These can initially be examined by microscopy for the identification of ectothrix arthroconidia spores. Up to 50% of *M. canis* strains fluoresce apple green under a Wood's Lamp.



MANAGEMENT

Clipping is not necessary in all cases but can facilitate topical therapy and remove infected hairs, reducing the pathogenic load and environmental contamination. This should be done with care to avoid further contamination from the clipped hair and skin trauma.

Topical therapy

Rinses, dips or shampoos are the preferred topical treatments, although many cats resist bathing. They should not be used alone, but can reduce the time to clinical and fungal cure, and environmental contamination. Lime sulphur solutions are effective and well tolerated, although staining and pungent.

Systemic therapy

- Griseofulvin - Griseofulvin can cause birth defects and may affect sperm quality.
- Itraconazole:
- Terbinafine has been used successfully for dermatophytosis and dermatophyte mycetomas although it is not licensed for animals. There is a long duration of activity and this may allow relatively short courses of therapy followed by careful monitoring. It appears to be well tolerated, albeit expensive.

Monitoring treatment

Clinical cure occurs before mycological cure and animals should not be regarded as cured until they have had 2-3 negative cultures at least seven days apart.

Environmental decontamination

The major source of contamination is the fungal spores on hairs. These may be removed with a combination of physical cleaning (including daily vacuuming – seal and burn the bag) and chemical agents.

Control of dermatophytosis in catteries and multi-cat households

The principles are: isolate the cattery and suspend breeding until the outbreak is controlled; separate infected and non-infected cats on the basis of culture and use barrier precautions to prevent spread of the infection - if it is impossible to isolate culture negative cats treat them all as culture positive; treat infected cats; eliminate environmental contamination; and prevent re-infection. Pregnant queens and kittens can be isolated and treated with topical lime sulphur, miconazole/chlorhexidine or enilconazole. Re-culture the negative cats and move any that become positive. Ideally do not move any infected cats until all of them are cured.

Prevention is better, less expensive and less time consuming than treatment. New cats and animals that have been to shows and/or stud should be isolated and cultured. Testing, treating and environmental monitoring has also been shown to control dermatophytosis in rescue shelters.

KEY POINTS

- There is great potential for misdiagnosis.
- **People can become infected as well as other contact animals**
- Diagnosis and monitoring of treatment should be based on culture
- Can be difficult and expensive to resolve infections so prevention is important

