DERMATOPHYTOSIS IN DOG AND CAT

Lefkaditis Achilleas Menelaos

D.V.M., PhD, Veterinary Clinic. Delfon 111, Z.C. 54644 Tel/Fax 00302310845930 Thessaloniki Greece. E-mail: mleuka@otenet.gr

Technological Institute of Thessaloniki, department of Companion animals.
Koukeri Eustathios Smaragda D.V.M. Veterinary Clinic Delfon 111, Thessaloniki Greece.

Abstract: Dermatophytoses in dog and cat are in great importance because of their prevalence and their ability to be a zoonosis. The prevalence in this study estimated in 18.18% of examined dogs and 71.05% of examined cats. All the examined animals (209 dogs and 52 cats) presented with dermatology lesions.

INTRODUCTION

Dermatophytosis is an infectious disease caused by a fungal agent that effect the hair follicle, nails and the keratin of the epidermis. The disease is zoonotic. In this infection, normally involving species of the genera Microsporum and Trichophyton. Microsporum canis is the most common cause of dermatophytosis in dog and cat. The sites of infection almost always are the hair follicles leading to crusting and hair loss. Microsporum pericolor infects the stratum corneum and not the hair shaft. Dermatophytes are classified into groups based on their natural habitat as the soil (geophilic), the animals (zoophilic) and the man (anthropophylic).

From the genus Microsporum the species canis is zoophilic and their hosts are cat, dog, horse, rodents and man. The species equinum is also zoophilic and has as hosts the horse, cat and dog. The species gypseum is geophilic ad has as hosts the dog, cat, horse and man. The species nanum is zoophilic and affects the pig and man. The species persicolor is a zoophilic fungi and has as hosts the dog, cat and rodents.

Regarding the genus Trichophyton, the species equinum is zoophilic and affects the horse, dog, cat and man. The species erinacei is also zoophilic and has as hosts the hedgehog, dog, cat, and man. The species mentagrophytes is a zoophilic fungi and affects the cat, dog, rodents and man. Finally verrucosum is zoophilic species and has as hosts the cattle, sheep and man.

Regarding the prevalence, M. canis is responsible for the great majority of canine infections. As a geophilic species, M. gypseum, is influenced by soil conditions and the prevalence of infection with this dermatophyte varies in different regions. M. persicolor is more difficult to diagnose as it infects the stratum corneum rather than the hair shaft and infection with M. equinum and M. nanum is rarely diagnosed. About 30% of dermatophyte infections are caused by T. mentagrophytes and infection with the other Trichophyton species is uncommon to rare.

Animals acquire infection of Dermatophytes by contact with their arthrospores derived from infected animals or soil (M. gypseum infection). Following adherence of the arthrospores to cells of the stratum corneum, germination occurs with production of hyphae, which invade the stratum corneum aided by the secretion of keratinases. Penetration of anagen hair shafts then occurs with invasion extending through the hair shaft (endothrix
invasion) as far as the new keratin at the base of the hair but not into the mitotically active hair matrix. Invasion ceases when hairs enter the telogen growth phase. Following hyphal invasion of the hair shaft, masses of infective spherical arthrospores are formed on the surface of the hairs (ectothrix production). Invasion provokes an inflammatory response and, under normal circumstances, this leads to resolution of the disease within 1-3 months. Following infection with a dermatophyte, the animal responds with both a cell-mediated and humoral response (Deboer and Moriello, 1994; Sparkes et al, 1993). The immune response, particularly the cell-mediated response, result in clearing of the infection (Jones, 1993). Chronic infection occurs when the host is unable to generate a curative immune response. *M. canis* spores in infected premises can remain viable for over 1 year. The disease is most often diagnosed in young dogs (animals less than one year old). Older animals are less susceptible and, if previously exposed to dermatophytes, may have developed immunity. Cats may develop a carrier status in the absence of clinically apparent lesions and represent an insidious source of contamination for dogs.

**MATERIALS AND METHODS**

209 dogs (121 male and 88 female, 81 young and 128 adult), and 52 cats (23 male and 29 female, 36 young and 16 adult) were examined for the presence of dermatophytes. All the above animals have dermatological lesions (because that the owners have brought them for examination).

The diagnosis of dermatophytosis is accomplished by dermatophyte test medium culture for 14 days. Inoculation of scale an hair from affected lesions will usually be positive within 3-15 days. Some organisms may be slow growers (*Trichophyton* spp.). Colony morphology and other characteristics should be determined in addition to color change of the medium. False positives are often associated with saprophytic fungal growth and the accompanying color change when the medium has aged and there is colony overgrowth.

**RESULTS**

After culture of samples for 14 days the results record that 38 dogs (21 male and 17 female, 29 young and 9 adult) and 27 cats (13 male and 14 female, 31 young and 7 adult) were positive for the presence of dermatophytes.

**DISCUSSION**

Regarding prevalence the statistical analysis of the results (significant difference factor P>0.005) the higher prevalence occurs in young cats and dogs. Dermatophytes can be recovered more frequently from animals less than 12 months of age, presumably because of a poorly developed of immune response (Wright, 1989; Lewis et al, 1991). Dermatophytosis in general, is more common in young animals (Wright, 1989), and dermatophytoses due to *M. canis* is more common in Persian cats (Lewis et al, 1991). Sex does not play an important role in the prevalence both dog and cats. The most common cause of dermatophytoses in cats is *M. canis* (Wright, 1989; Lewis et al, 1991). In dogs the most common are *M. canis* and *M. gypseum* (Wright, 1989; Lewis et al, 1991). Although exposure to the infective arthrospores of the fungal element may lead to an active infection, normal host defenses often will prevent the establishment of clinical disease. A number of factors may come into play during this process. It is well recognized that the immaturity of the host immune system in the neonate or
juvenile may play a prominent role in the susceptibility of infection in the young animal. The ability of the host to mount an inflammatory response is critical to the course of the infection. Asymptomatic carrier states of *M. canis* is well recognized and demonstrates the balance between host and potential pathogen. Suppression of immunomechanisms may also lead to infection or be associated with chronic persistent disease. Conditions such as feline leukemia virus infection, FIV or neoplasia may be underlying reasons. Chronic or aggressive steroid therapy has been associated with protracted disease in some situations.

Clinical signs of dermatophytosis may be variable depending upon the extent of host response. The classical lesion is the one characterized as a focal or multifocal areas of alopecia including broken hairs at the periphery, which extend centrifugally and may heal centrally. Pruritus may be variable, typically low to absent. Other lesions, as folliculitis and furunculosis, which may be well demarcated and can resemble autoimmune disease, scaling which may be quite extensive and may or may not have an erythematous margin, nodular, deep, inflammatory, suppurating lesions, also known as “kerion”. Typical lesions consist of one or more 3-cm diameter, discrete focal areas of fine scale and stubbled hair, typically on the face, head, or feet (Wright, 1989). In the healing phase, lesions may be smooth and shiny, particularly with *Trichophyton* infections, *onychomycosis*: infection of the claws may occur with or without evidence of claw bed inflammation (paronychia) and onychodystrophy. Animals which are old, infirm, immunoincompetent, or severely stressed are also predisposed to dermatophytosis and exhibit more severe clinical signs (Wright, 1989; Moriello, 1990). Secondary bacterial infection, particularly with staphylococci, may occur. Dermatophytes can be isolated from the skin and hair of apparently normal cats, particularly those in colonies, show circles, and pounds, although healthy pet cats are unlikely to be infected (Quaife and Womar, 1982; Morielo et al, 1994; Sparkes et al, 1994). Experimental infections result in lesions reaching maximum size about 5 weeks after infection (Deboer and Moriello, 1995; Moriello and Deboer, 1994).

Clinical signs may not be diagnostic and thus history, indicating contact with infected animals or people, and diagnostic tests are of prime importance. The clinical signs in cats can vary from asymptomatic carrier to a crusting dermatitis (Moriello et al, 1994; Moriello and Deboer, 1991; Sparkes et al, 1994) In order to establish the diagnosis other techniques such as Wood’s lamp can be used but is not reliable in many cases and should not be used for diagnostic confirmation. The inclusion of biopsy should be performed in the event of negative culture findings in the face of lesions with high suspect or in the event of a nodular dermatitis with other major differentials where dermatohistopathology may be helpful. The MacKenzie brush technique is often helpful in cases where there are minimal lesions as in the asymptomatic carrier or to reevaluate by fungal culture during the treatment of a case. This procedure uses a new or sterile toothbrush which has been used to groom the animal. The bristles are pushed slightly down into the media and existing scale and hair removed. Complementary examinations, are the Wood’s lamp, *Microsporum canis* infected hairs will fluoresce with a characteristic apple green colour in about 50% of cases, other dermatophyte species do not induce this fluorescence, direct microscopic examination, cytology of smears, and fungal culture.

Isolation of the dermatophyte confirms the diagnosis and enables the species involved to be identified. This may aid determination of the source of the infection. Note that dermatophytes may sometimes contaminate the coat and thus compatible clinical signs should be present in addition to the presence of the pathogen before dermatophytosis can be confirmed. Prior disinfection of the site to be sampled with 70% alcohol may be useful in reducing growth of other organisms.
The treatment is systemic or topical or both. Systemic treatment is the treatment of choice to efficiently resolve the active infection. It is important to note that many dermatophyte infections will resolve spontaneously within 3 months and thus recovery may not be directly related to the therapy used.

Topical therapy is unlikely to be effective on its own in eliminating infection but it may help to reduce contamination of the environment and spread of infection to owners and other animals. A combination of topical and systemic therapy is best in most cases. Localised lesions can be treated with miconazole or clotrimazole creams and lotions applied daily. More extensive infections can be treated with eniliconazole washes at three-day intervals. Chlorhexidine shampoos may also be beneficial but concentrations above 2% should be used. Systemic treatment with Griseofulvin, in doses of 30–50 mg/kg daily normally be needed for weeks to months and should be continued for at least two weeks after clinical recovery. Imidazoles, like Ketoconazole and itraconazole are also used although itraconazole is not registered for veterinary use. Ketoconazole is employed at 10 mg/kg daily and itraconazole has been used at 5 to 10 mg/kg daily. Terbinafine (Lamisil) is a recent systemic antifungal which may be safer than ketoconazole or even itraconazole. The dosage is 10-30 mg/kg every 24 hours. Additional treatment of dermatophytosis should be carefully investigated in all in-contact pets, especially in cats (which can be important asymptomatic carriers). Fungal vaccine is commercially prepared and introduced as Fel-o-Vax MC-K by Fort Dodge. This vaccine is intended to be used as an adjunct to treatment rather than a prophylaxis.

Dermatophytosis is a zoonotic disease and their clinical signs in human are often mild, self limiting; scaling, redness, and occasionally vesicles or fissures. Thickening & discoloring of nails. May show circular lesions which clear in the center forming a ring. Fungal infections in man are categorized as to the location on the body: 1. Tinea capitis - Scalp & hair 2. Tinea corporis - Body (extremities, arm and hand, are most often affected in infections acquired from lab animals.) 3. Tinea pedis - foot 4. Tinea unguium – Nails.

REFERENCES
