Analele Universităţii din Oradea, Fascicula: Ecotoxicologie, Zootehnie şi Tehnologii de Industrie Alimntară, Vol. XIV B, 2015

ZOONOSES INCIDENCEOF FUNGAL AMONG CATS COMMUNITY NATURE ORADEA

Chirila Ramona*

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: rpurge@yahoo.com

Abstract

Superficial mycoses are fungal infections that affect the superficial layers of the skin, hair and claws. In recent decades, there is an increased incidence of dermatophytes, both in humans and susceptive animals. In urban areas, domestic carnivores and cattle infected with dermatophytes are a way to prevent and combat them in humans and animals. In this context, knowledge of morphological characters of dermatophytes, epidemiological implications referral, correct diagnosis of clinical and lesional manifestations, choosing the most effective therapeutic protocol, are some relevant aspects that contribute to the success of these dermatophytosis parasitological surveillance.

Key words*:* dermatophytes, infection, therapy, lesion

INTRODUCTION

Dermatophytoses of carnivores are diseases with sporadic development. Rarely, in cats' shelters, they experience an enzootic development. Microspore is also encountered in wild carnivores (fox). For fox farms, the source of infection is represented by the dogs and cats in farms' neighborhood(4).

Prevalence of dermatophyte infection in carnivores is highly variable and influenced by a number of factors such as: size of the sample tested; period under study; solitary animals, stray or those of exhibitions; animals with clinical or asymptomatic lesions.

Epidemiological surveys conducted in Europe, US, New Zealand and South America show a higher incidence of dermatophytes in carnivores, the incidence of cats' dermatophytoses being 2-3 times higher than in dogs (4).

Studies conducted nationally establish in urban areas an incidence of dermatophytosis of 1.55% in dogs and 6.33% in cats . A study conducted by the team of Parasitology Clinic Timişoara revealed an incidence of 26.5% microspores in cats out of all skin diseases; dermatophytosis prevalence was

higher in young cats of European race. Dărăbuș reports an incidence of this disease in dogs of 6-8%, most affected being young individuals.

The sources of contamination are the infected animals (with injuries or latent infection), the asymptomatic carriers, the various toiletries and infected means of transportaton. Depending on dermatophytes concerned, transmission between different species is possible.

In case of geophilic species and also for some antropofile and zoophyte species that live on ground, the external environment is a source of infection. This was demonstrated by cultural isolation of dermatophytes species (*M. canis, T. mentagrophites, M. gypseum*) from veterinary clinics floors, heating pipes, chimney vent filters and from the air.

Human infections with zoophyte species present a dual source: either direct contact with an infected animal or indirect transmission through infected material from the environment. The first possibility seems more effective and plausible, but we must not ignore the second transmission, which is of special epidemiological importance.

Depending on populations pursued by the epidemiological study, a different incidence of dermatophytic infections is revealed. Thus, in rural areas, the *T verrucosum* infection is more common, through contact with contaminated cattle, while in urban areas, it is more frequent the contact with pets, *M. canis* being the species most often implicated in the etiology of human dermatophytoses. Apartment rodents (rabbits, mice, guinea pigs) can play an important role in transmitting infections with *T. mentagrophytes* and *T. quinckeanum* (5).

The source of infection with *M. canis* is present in most cases of infected cats (Mancianti and Papini, 2003), and for *Trichophyton spp.* by different typical hosts (eg. rodents for *T. mentagrophytes*). The studies supportin the transmission of dermatophytosis from dogs to humans by the plethora are the same as those that relate to cat-human epidemiological chain (10).

The presence of dermatophytes spores is usually insufficient to produce clinical lesions. Susceptible species must infect with a minimum number of spores (arthropod-spores, conidia) for infection to occur. The minimum infective dose is unknown but may be influenced by the virulence of the dermatophytes species and host reactivity. Durability of spores outdoors is notable, as they may remain viable months or even years (6). Responsiveness of carnivores to these infections is influenced by a number of factors represented by race, sex, age, diet, inter-current illness, substance immunosuppressive therapy, immune compromised status and stress.

MATERIALS AND METHODS

The reasearches were performed on homeless cats from Oradea. The 30 cats were captured in different areas of the city. In this context, the need for laboratory investigations based on direct microscopic examination of crusts and hair were made with Wood's lamp examination, cultural examination and histopathological examination.

Pathological material examined by this method is the hair (torn, doubtful or positive during Wood's lamp examination), crusts, squamae, nail fragments or exudate.

Morphological elements of dermatophytes that are identified by these direct examinations are artrospores and hyphae. Hyphae can be separated and branched, of variable length and width of 2-4 μm. Artrospores often remain associated as small chains or in piles and their diameter varies, depending on the species of dermatophytes, with 2-10 μm. Artrospores' size and their endothrix, ectothrix (exo-endothrix) arrangement or the favic type present issues with some utility for an experienced examiner. The sensitivity of this test is considered low in the case of inflammatory lesions accompanied by exudation (7).

Infected hairs exposed to UV radiation with a specific wavelength (360 nm), emit a characteristic greenish-yellow fluorescence. This fluorescence is produced by the presence of some tryptophan metabolites and not by the presence of spores and hyphae.

This exam is assigned a guiding character, it does not allow a diagnosis of certainty; furthermore, it is considered that only 50% of *M. canis* strains can produce fluorescence. The method is considered especially useful for the detection of asymptomatic carriers of *M. canis* (fluorescent strains). It is also important to know that the fluorescence can be caused by sebum, oil from the peel of citrus fruits, textile fibers, topical drugs, infection with *Demodex spp* or the seeds of *Pseudomonas* type, but this fluorescence is purple-blue or red (9).

The main role of this examination is to isolate and identify the species of dermatophytes, as a reference examination that allows a final diagnosis. The most common environment is Sabouraud agar, added with chloramphenicol and gentamicin of 0.5% and cycloheximide (actidione), which inhibit the growth of bacteria and contaminant fungi. In veterinary medicine, in order to isolate them, the dermatophytes test medium (DTM) is preferred. It contains Sbouraud agar added with gentamicin 0.5%, cycloheximide and phenol red as color indicator. Human mycologists avoid

using DTM because some anthropofilic dermatophytes, *T. rubrum* in particular, present various morphological characteristics and pleomorphism rapidly occurs; these issues were also raised in the case of zoophilic dermatophytes (8).

Most species of dermatophytes grow approximately 10 days, except for *T. verrucosum*, whose development takes about 28 days. Dermatophyte colonies are almost always white and never greenish. brown or in mixed colors. Most dermatophytes develop a combination of form, texture, pigmentation and a microscopic/macroscopic structure characteristic to colonies, enabling their identification.

Sensitivity of ELISA was tested on a group of dogs with *Microsporum canis* parasite and was estimated at a value of 83.3%. The reaction of *M. canis* antigen isolated from parasitized hair revealed high levels of immunoglobulin G in a 95.2 percentage of the total number of dogs studied. PCR technique showed different strains of *M. canis* and *T. mentagrophytes* species.

RESULTS AND DISCUSSION

From the 30 cats tested the hole cats were positive with *Microsporum canis*. Cutaneous immune system brings into play a series of fixed cells (keratinocytes, capillary endothelial cells) and mobile cells (Langerhans cells, epidermal T cells) which intervene directly or through cytokine into defense. Incoming foreign antigens induce cytokine production in the epidermis (by keratinocytes), which attract inflammatory cells (neutrophils and macrophages). At the same time, Langerhans' cells capture antigens, they exhibit their surface with molecules of the major histocompatibility complex, class II, migrate to the local lymphoid tissue, where it interacts with precursor T lymphocytes, leading to their clonal expansion. Activated T cells migrate to the dermis and epidermis, where they initiate an effective cellular response against pathogenic microorganisms.

Immediate cellular immune response appears to be decisive in eliminating fungal and in the healing process. Both in humans and in animals, the resolution of an acute infection is accompanied by a state of delayed hypersensitivity .

Until recently, the immune response in dermatophytosis has not been studied. The works during the 90’s showed that in both the natural infection and the experimental *M. canis* in cats there is an humoral and cell-mediated immune response, the latter appearing to be associated with clinical resolution of the lesion (5).

In carnivores, because the infection is always follicular, lesions start, as a rule, by the appearance of hair agglutinated at their roots in a crust of a

few millimeters in diameter, after which the hair falls, leading to the appearance of a small circular depilated area, well defined.

Starting from this point, literature describes three main clinical forms: dry form, where lesions evolve typically or atypically; wet, where lesions have a suppurative character; favice form lesions, whose evolution is similar to the favic pitting described in murines. These three clinical forms are added an asymptomatic carrier state. Asymptomatic carriage is frequent in domestic carnivores, particularly cats. Asymptomatic carriers' nature of feline population is, in most cases, misunderstood. One must distinguish between cats infected with subclinical lesions and non-infected cats that only carry spores on their fur. In the first situation, fungus grows on the skin and produce infective spores that contaminate the environment and other hosts. These cats require therapy and represent an epidemiological danger. Cats in the second group act as carriers and contaminate the environment with a small number of spores. These cats present less danger and are only treated topically.

CONCLUSIONS

In the case of carnivores' dermatophytoses, as in other zoonotic diseases, treatment should be based on a series of general principles, on which to apply different methods and means of existing treatment. In this context, the success of treatment is to combine three main objectives:

- increasing the patient's ability to respond to infection by correcting any nutritional imbalance, current state of disease, and by remoing the systemic anti-inflammatory and immunosuppressive medication;
- interrupting infection, minimize the severity and duration of lesions;
- stopping dissemination of infectious material in the environment, where it would become a reservoir of infection for other animals and humans.

Carnivores' dermatophytosis sometimes can recover spontaneously without therapeutic intervention, within a variable period of time, related to the host reactivity and the dermatophyte species involved.

It is necessary to train owners and staff kennels and cat breeders in order to know and limit these zoonoses. Specialists in cat and dogs care centers should be informed of the trimming ban of infected carnivores. Pruning animals should be done in special rooms, with disinfection resources, and instrumentation and tools used will be disinfected for each patient.

REFERENCES

1. Ironim Suteu, Vasile Cozma, 2000- Bolile parazitare la animalele domestice, Editura Ceres, Cluj Napoca.
2. Cosoroaba I, 2005, Zoonoze parazitare, Ed First Art Press, Timisoara.
3. Darabus Gh. (2002), Epidemiologia micozelor si micotoxicozelor in Elemente de epidemiologie a bolilor transmisibile, Ed. Oriz, Timisoara.
4. Mancianti F, Papini R, 2003, Isolation of keratinophilic fungi from from floors of private veterinary clinics in Italy, Vet. Res. Commun., 20, 2, 161-166.
5. Palmer S. R., Soulsby E, J Simpson, 2005, Zonoze, Ed. St Med, Bucuresti
6. Romeo Teodor Cristina, Valer Teusdea, 2008- Ghid de farmacie si terapeutica veterinara, vol 3, Editura Brumar Timisoara.
7. Rosano M, 2005, Alternative treatment of the dermatomycosis in cats, Vet Argentina, 22, 220, 784.
8. Solcan GH, Mitrea I., 2003, Dermatologia animalelor de companie, Ed. Iasi.
9. Suteu, e Dulceanu 2000, Parazitoze cutanate la animale, Ed. Risopont, Cluj Napoca
10. Zabor A . H., 2008, The role of cats and dogs in the epidemiological cycle of Mycoses, 29, 185.