Microsporum canis and other dermatophytes isolated from humans, dogs and cats in Mexico City

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Abstract

Introduction: Tineas or ringworm are infections caused by dermatophytes, a group of keratinophilic fungi. According to origin and tropism, they can be classified as anthropophilics, zoophilics and geophilics.

Objectives: To obtain current data in zoophilic dermatophytes in humans and animals in Mexico City.

Material and methods: We performed an observational, descriptive and retrospective study in two different Departments of Mycology in a General Hospital. We studied dermatophytic infections in 8,684 patients (human cases), and in 480 animals (377 dogs and 103 cats) at the Faculty of Medical Veterinary, University of Mexico.

Results: 57 of the 8,684 human patients (0.65%), had zoophilic dermatophytes: *M. canis* 43 (75.5%), *T. mentagrophytes var. mentagrophytes* 13 (22.9%) and *M. nanum* 1 (1.6%); 40.8% were men and 59.2% females.

At the Veterinary Faculty, 377 samples from dogs and 103 from cats were studied, with 33 (8.73%) and 36 (34.95%) positive cultures respectively. In dogs *M. canis* 72.70%, *Trichophyton terrestre* 12.15%, *M. gypseum* 9.10% and *T. mentagrophytes* 6.10%, and in cats only *M. canis* was isolated.

Conclusions: In humans and in animals *M. canis* is still the main causal zoophilic agent. In children tineacapitis is the most frequent dermatopytosis. Tineacorpis is the second one, and usually related to close contact with infected pets.

Introduction

Tineas or ringworm are infections caused by keratinophilic fungi called dermatophytes that can also invade the skin and its appendages [1]. There are three anamorphic genders: *Trichophyton*, *Epidermophyton* and *Microsporum*, none of which form part of the cutaneous flora. They can be classified according to their origin and tropism in anthropophiles, zoophilics and geophilics. These infections constitute 70 to 80% of all mycoses and represent 5% of the dermatological consults [2,3].

Infection is by direct contact with the causal agent and it can appear in any race, sex, socioeconomic level or occupation [3]. The animals act as reservoirs and can be symptomatic or just be carriers.

Among the zoophilic dermatophytes, *Microsporum canis* and *Trichophyton mentagrophytes*, are of main medical relevance in Mexico.

The tineas are frequent in domestic and savage animals: they are found in bovine, pigs and equine as well as in poultry, the most affected ones, are the small species, such as dogs, cats and rodents. To acquire infection, a direct contact with the contaminated source is needed, soil or animal or it can also be transmitted from person to person or by fomites [3].

Our aim is to obtain the current frequency of the zoophilic dermatophytes in samples collected from patients and animals with a clinical diagnosis of tinea in a general hospital and in a veterinary clinic respectively.

Material and methods

We performed an observational, descriptive and retrospective study in two departments of mycology, at “Dr. Manuel Gea Gonzalez” General Hospital, and at the Faculty of Medical Veterinary, Autonomous National University of Mexico (UNAM).

During a 10-year period, a mycological study was performed, in 8684 patients with cutaneous lesions suggestive of tinea in the hospital and in the same period, 480 animals at the Faculty of Medical Veterinary. 377 dogs and 103 cats with suspected dermatophytes. All of them were included.

A direct exam with 20% potassium hydroxyde (KOH) and a culture in Sabouraud dextrose agar with cycloheximide and chloramphenicol at 30°C were performed in samples from humans and animals. Identification was performed based in the morphologic criteria by the microscopic observation with lactophenol cotton blue.

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Discussion

According with 4th National Consensus of Superficial Mycoses in Mexico (2008), 70 to 80% of mycoses in outpatients were caused by dermatophytes [4]: 2% tineamannus, 4% tineacuruis, 4-10% tineacapitis, 15% tineacorrosions, 30% tineaugiump and 45% tineapedis [4]. These data are considered on the basis of a general population, but, only tineacapitis is almost always present just in children. [5]

In the current study, the majority of the cases in humans correspond to tineacapitis (43.68%) followed by tineacorrosions (27.86%) because the highest percentage of patients was found from 0-10 years of age (46.89%). This data is congruent, as tineacapitis was the most frequent affected was the pediatric group, with an exceptional case in a 97-year-old female [5].

M. canis was the most frequent dermatophyte. It is present in 4.1% among general statistics and is the causal agent in 60 to 89% of tineacapitis in Mexican children [3,6]. The contact with domestic animals represents the main source of infection in up to 83%. [3,6] Similar results by Montecagudo [7], after his study conducted in Santiago de Compostela with 196 cases of tineacapitis, observed M. canis in 70-95%, and T. mentagrophytes var. mentagrophytes in 14.8%, and a low frequency of other non-zoophilic species. These data are different from USA reports, where the main causal agent of tineacapitis is T. tonsurans (90%), the increase incidence of this agent is related to migrations of Afro-Americans and Latin American [3,8]. Also in Madrid, T. tonsurans incidence has increased in the last years, and M. canis is now in the second place. In Puerto Rico about two thirds of tineacapitis are caused by T. tonsurans and the other third by M. canis [9].

In Jordan after conducting a 6 years epidemiological study, Shagra [10] found T. violaceum as the main causal agent in tineacapitis, and in second place, M. canis. Mseddi and Makni in Tunisia, separately reported 83 and 68% tineacapitis caused by T. violaceum, and M. canis in 29.2% [11,12]. Also Ouidaina, in Morocco, after finishing a study with 1299 patients from 1993 to 2007, identified 76.4% of tineacapitis due to T. mentagrophytes, while M. canis 13.4% [13]. In the same country, Boumhil, studied 162 patients from 2002 to 2008, finding 63.58% of infections due to T. violaceum and 33.33% to M. canis [14]. Arenas et al., reported in an epidemiological study conducted in the urban and rural zones of Dominican Republic, a resurgency of M. audouinii and T. tonsurans respectively, probably due to the migratory movements from Haiti, while M. canis was found in 19.04% and 11.65% respectively [15].

Tineacorrosions, ranked second in frequency of the clinical forms observed in our study (27.86%). According to the National Consensus of Superficial Mycoses [4], T. rubrum was the main causal agent, followed by M. canis, however it must be considered that tineacorrosions caused by M. canis is more typical of pediatric patients, as we are reporting in this paper. In a retrospective study in Mexico 357 cases of tineacorrosions were reported in 21 years, and M. canis was found in 16.7% [16]. Meanwhile, Cafari et al. [17], in 2005, performed in Bari, Italy, a dermatophytic search in dogs and cats, which owner had or had not tinea and found M. canis in 53.6% of cats and 36.4% in dogs whose owners had tinea, and in only 14.6% of cats and non in the dogs which owners did not have tinea, concluding that one must be aware that the animals are a source of infection.
Concerning tineafaciei (20% of tinea corporis) and onychomycosis, in this study each one was present in 9.5%. In Italy, Monod performed a study of facial tinea caused by *M. canis*, reporting 91.3% of the children infected by their pets. [18] According to Romano et al., the medium age in tineafaciei is close to 27 years of age, while in Aste et al., paper, it is more common between 36 and 45 years of age. [19] Our facial cases were found in the age group of 20 to 50 years.

We found a lower frequency of *M. canis* in other dermatophytic infections, 9.5% in onychomycoses and 6.25% in tinea pedis. Kazemi, in Iran, studied 590 patients from 1996 till 2004, found zoophilicdermatophytes such as *T. mentagrophytes* and *M. canis*, with a frequency of 65.5% of cases with onychomycosis; Sei in Japan, identified *M. canis* in just 5 cases in 36,052 ambulatory patients. In feet and nails, *M. canis* is uncommon but *Trichophyton* spp are more contagious and responsible of outbreaks in endemic countries, and zoophilic fungi are just related to small familiar epidemics [20-22].

From the veterinary point of view, *Microsporum canis* is the most common dermatophyte in pets [18]. Worldwide 90-100% of dermatophytoses in cats are caused by *M. canis* [23] and usually its isolation in asymptomatic animals indicates subclinical infection or carrier [24].

In the laboratory of the faculty of veterinary medicine at the UNAM, 100% of *M. canis* was reported in the hair of cats and 72.70% in dogs, similar to Lorio in Italy, who showed that the stray cats are an important source of dermatomycosis, because he isolated fungi in 100% of the hair samples [25]. Boumhil in Morocco reported that 56.7% of the cases with tinea capitis have been originated from direct contact with animals [14]. Cafarchia in Italy and Seker in Turkey [26,27], described cases with tineacapitis have been originated from direct contact with animals housed [31].

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In this study *M. gypseum* was isolated in a 9.10% of dogs’ samples, which differs from the reported percentage by Álvarez et al. [28]. Also, children are more often in direct contact with pets. Infections may be related with poor hygiene especially when animals are too close to each other (esthetics and veterinary clinics) and can become a focus of infection. Zoophilic or geophilicdermatophytes could also be the cause of family epidemics.

### References

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