Medical Journal of the
Islamic Republic of Iran

Volume 7
Number 4
Winter 1372
February 1994

AN EPIDEMIOLOGICAL APPROACH TO THE ZOOPHILIC DERMATOPHYTOSES IN IRAN

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ABSTRACT

Dematophytosis in domestic animals constitutes a constant source of infection for persons in contact with them. To have an epidemiological picture of zoophilic dermatophyte infections in Iran, a study has been carried out during a period of three years (1986-1989) in an attempt to find the causative dermatophytes which infect cats and cattle and also infected human subjects in contact with them.

For this purpose, 9850 samples of hair and skin were collected from suspected cattle, 953 from suspected cats, and 2326 from infected human subjects. Clinical diagnosis was confirmed by direct microscopic examination and culture. The species isolated from all cattle were *Trichophyton verrucosum*; from cats, *Microsporum canis* and man, *M. canis*, 1583(68.1%) and *T. verrucosum* 743(31.9%). From the infected human cases, mostly *Tinea capitis* and *Tinea corporis* were detected among the age groups of 1-9 and 20-29 years old, respectively. The incidence rate observed in winter and fall was higher than spring and summer.
MJIRI, Vol. 7, No. 4, 253-257, 1994.

INTRODUCTION

Dermatophytosis (ringworm) is the infection of keratinized structures, including the hair, nails, or stratum corneum of the skin, by organisms of fungi termed the dermatophytes. The dermatophytes are a group of fungi comprising three genera, trichophyton, microsporum, and epidermophyton which have the ability to colonize the skin and its appendages. The dermatophytes can be classified as anthropophilic (found mainly in man), zoophilic (found mainly in animals), and geophilic (found mainly in the soil).[10]

Dermatophyte infections of wild and domestic animals have been recognized for many years. It has been pointed out repeatedly that animals act as a reservoir for human dermatophytosis.[2,7] Ringworm disease in domestic animals constitutes a constant source of infection for persons in contact with them. Thus, zoophilic dermatophyte infections are particularly common in rural areas. Fungi from domestic animals, such as dogs and cats, may initiate an epidemic among children.[3,4,15]

In addition, wild animals also harbor ringworm and may be an indirect source of human infections, since the infected hairs shed from these animals may contaminate dwelling places and working areas.[10]

Mites also transmit dermatophytes among animal populations.[5] Sometimes contamination from rodent carriers leads to outbreaks of severe dermatophytosis in human populations.[10]

The specific pathologic picture of the infected animal, the dermatophytes involved, and the frequency of transmission of such infections to man have been reviewed by Otcenasek[8] and Mantovani.[7]

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Fig. 1. Ringworm of cattle. Dry, scaly, raised lesion on ear.

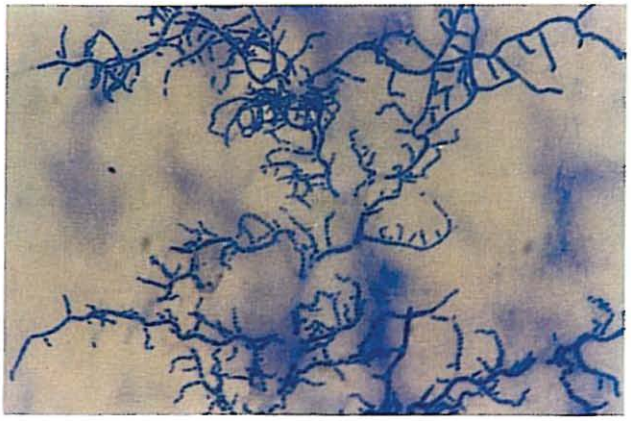

Fig. 2. *T. verrucosum.* Microscopic view showing chains of arthroconidia and chlamydoconidia produced at 37°C.

PATIENTS AND METHODS

Between May 1986 and December 1989, 9850 cattle, 953 cats and 2326 human cases of suspected dermatophytosis were clinically diagnosed and studied at the Mycology Laboratory of the Faculty of Veterinary Medicine, University of Tehran, by direct microscopic observation of the clinical specimens and by cultures.

Samples of hair and skin scrapings were collected in an envelope and labeled accordingly. Direct microscopic observation of the samples was carried out by examining the material in 10% KOH/DMSO and lactophenol. Each sample was cultured in two plates, containing Sabouraud's glucose agar with streptomycin and cycloheximide and incubated in two different temperatures (30 and 37 degrees centrigrade).

Standard methods and criteria, based on the gross and microscopic morphology of the isolates, were used to identify the isolated strains.

Fig. 3. Tinea of cat. Lesion on back showing alopecia.

Fig. 4. Tinea of cat. Scaly lesion on head.

RESULTS

Results of the positive findings by direct microscopic examination of the samples were as follows:

Cattle, 7110(72.2%), cats, 321(33.9%) man, 1023 (43.9%).

Since we cultured each sample in four corners of two plates and incubated them in two different temperatures, we obtained better results and the results of all samples were positive.

Isolated species from different samples were as follows:

Cattle: *T. verrucosum* (Figs. 1,2)

Cats: *M. canis* (Figs. 3,4)

Human: *M. canis*, 1615(69.4%), *T. verrucosum*, 711(30.4%).

The commonest clinical type of scalp ringworm was ectothrix (Fig. 5). From the infected human cases, *Tinea capitis* and *Tinea corporis* were the commonest dermatophytosis in the age groups of 1-9 and 20-29 years old, respectively (Table I), (Figs. 6-9).

In rural areas, the most infectious factor in man was *T. verrucosum* (3.1%), and in urban areas, *M. canis* (93.5%), (Table II). The high incidence rate observed in winter and fall was greater than spring and summer (Table III).

Fig. 5. Ectothrix. Conidia are found around the hair shaft.

Fig. 8. *Tinea corporis.* The periphery is quite erythematous and inflamed.

Fig. 6. Acute form of *Tinea corporis* caused by T. verrucosum.

Fig. 9. *Tinea corporis.* Some vesicles are evident in several places on the lesion.

Fig. 7. *Tinea capitis.* Severe inflammatory reaction (kerion produced by infection with *T. verrucosum.*

DISCUSSION

Dermatophytoses in cattle and cats have worldwide distibution and in most cases the causative organisms are *T. verrucosum* and *M. canis.*[9,11] It has been pointed out repeatedly that animals act as a reservoir for human dermatophytosis and the infections are transmitted from animals to man.[2,3,6,7,11,13]

Colonization of man by zoophilic dermatophytes usually results in an inflammatory disease. Ectothrix infection with animal origin is distinguished clinically by a more marked inflammatory reaction than other forms of *Tinea capitis.*[10] In this study, in most cases of *Tinea capitis* and *Tinea barbae*, kerion, keloid, and severe inflammatory disease were much more frequent.

In our study, *Tinea capitis* occurred in children, particularly in those between the age of 1 and 9 years, as in other parts of the world.[12,14] There are reports in different countries of limited epidemics of this problem among school children which are contact with animals.[4,15]

Tinea capitis was more prevalent in female children than in males. The reason for this is not fully understood, but could be partially atributed to the fact that female children keep their hair long and thus make it more difficult to keep it in a clean condition, whereas male children have their hair cut fairly short. However, wearing longer hair usually

Table I. Age groups of patients related to the different tinea and sex (Iran, 1986-1989).

Age	Sex	TC	TCo	TB	TU	TM	Total	
1-9	F	765	9	-	-	-	774	1151
	M	363	14	-	-	-	377	
10-19	F	178	21	-	-	-	199	339
	M	110	30	-	-	-	140	
20-29	F	10	242	-	-	-	252	530
	M	15	251	12	-	-	278	
30-39	F	-	62		-	2	64	179
	M	6	48	51	7	3	115	
40-49	F	-	39		3		42	112
	M	-	35	29	6	-	70	
50+	F	-	2			-	2	15
	M	-	5	3	2	3	13	
Total		1447	758	95	18	8	2326	

TC= *Tinea capitis* TB= *Tinea barbae* TM= *Tinea manuum*
TCo= *Tinea corporis* TU= *Tinea unguium*

Table II. Different tinea related to the locality and etiological agents (Iran, 1986-1989).

Tineae	Locality	*M. canis*	*T. verrucosum*	Total
Tinea capitis	R	159	417	576
	U	798	73	871
Tinea corporis	R	49	119	168
	U	573	17	590
Tinea manuum	R	-	8	8
	U	-	-	-
Tinea barbae	R	18	56	74
	U	18	3	21
Tinea unguium	R	-	16	16
	U	-	2	2
Total		1615	711	2326

R= Rural area
U= Urban area

brings about using combs and brushing more often, which may be shared by a group of people.[1,14]

In our study we have found that dematophytosis in humans was mostly caused by *M. canis* in urban areas and by *T. verrucosum* in rural areas. Thus, cats and cattle were important sources in human dermatophytosis in Iran.

TABLE III. Frequency distribution of ringworm related to the season (Iran, 1986-1989).

Cases	Spring	Summer	Fall	Winter	Total
Cattle	1873	1426	2760	3791	9850
Cats	209	201	229	314	953
human	385	384	604	953	2326
Total	2467	2011	3593	5058	13129

It seems probable that temperature and humidity were the reasons forcausing differences in seasonal incidences of the dematophytoses. The rise in the incidence of dermatophytosis in winter and fall was due to lower temperature and higher humidity in these seasons of the year.

ACKNOWLEDGEMENTS

The authors would like to thank all responsible people of Tehran University and health research centers for their valuable help.

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