

Caprine Dermatitis Caused by *Trichophyton mentagrophytes*

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Summary

Trichophyton mentagrophytes was described as a primary cause of mycotic dermatitis in two young goats housed together in a humid, ill-ventilated and unhygienic byre. The diagnosis in both the cases was established on the detection of fungal element in the skin scrapings by potassium hydroxide technique and isolation of the pathogen in pure growth on mycological medium at 30°C. The lesions were found on the face of one kid and on the neck and ear of another one. Two adult goats housed in the same enclosure were found to be free from this disease. Further, there was no evidence of ringworm in the goat owner and his family members. Genetic crossing of both the isolates on modified sunflower seed medium indicated that they belonged to (–) mating type. Hair perforation test revealed the keratolytic activity of both the strains of *T. mentagrophytes*. The public health significance and chemotherapy are also discussed. The question of source of infection could not be emphatically established.

Introduction

Dermatitis is one of the most frequently encountered clinical disorders in large as well as small animal practice. Among different etiologies, dermatophytes are considered an important cause of dermatitis in a wide variety of animals including man.^{2,3,6,14,24} The disease is highly infectious and contagious in nature and is reported from most parts of the world. The literature reviews indicated that caprine dermatophytosis is a rare condition in Veterinary Medicine.^{2,10} The purpose of this communication is to delineate the etiology of caprine dermatitis and its successful management with topical medicament.

Materials and Methods

Skin scrapings obtained from 2 clinical cases of der-

matitis in kids, 2 healthy adult goats and 3 persons from animal owner's family constituted the material for this investigation. The age, sex, location of skin lesions, duration of illness, condition of goat pen etc. were recorded on a proforma. A part of the material was treated in a mixture containing equal parts of 20% of potassium hydroxide(KOH) and dimethyl sulfoxide (DMSO) for 5 mts and then examined microscopically for the presence of fungal elements. Each sample from animal origin only was first soaked in a solution containing chloramphenicol(0.1mg/ml) and actidione (0.5mg/ml) for 3~5 mts before inoculation on to the slants of sabouraud dextrose agar with chloramphenicol (0.5mg/ml) and actidione (0.05mg/ml). Three tubes of the medium were streaked with each specimen and incubated at 30°C for 30 days. In positive cases, specimens were cultured on the plates of blood agar and in-

cubated at 37°C for 48 hrs.

In addition, 3 soil samples collected from the goat pen were also examined for the dermatophytes by hair-bait technique.²⁶⁾

The morphology of the isolates was studied in a recently developed 'PHOL' stain.¹⁹⁾ (5ml of 4% aqueous solution of 35% formaldehyde, 3ml of glycerol and 0.3ml of 3% aqueous solution of methylene blue.) The organism was identified according to the criteria laid down by Rebell and Taplin²¹⁾ and Carter.³⁾

The sexual reproduction of the isolates was conducted on modified sunflower seed medium¹⁶⁾ which contained sunflower seed 22.5 g, MgSO₄ 0.5 g, KH₂PO₄ 1.0 g, Agar 20.0 g and distilled water 1000ml. Ten-days old growth of *T. mentagrophytes* was crossed with standard tester strains of *Arthroderma simii* mt '+' (MP-2005) and mt '-' (MP-2006) on the plates of sunflower seed medium. The plates were kept at 20°C for 3 weeks and the growth from the paired colonies was examined in 'PHOL' stain.

Keratolytic activity of both the isolates was tested *in*

vitro with equine hair.

The chemotherapy was done with topical application of 2% solution of tincture of iodine on each lesion after removal of crust with plastic brush in an enamelled bowl with 5% lysol. The drug was applied two times daily for 21 days. The mycological evaluation of the treatment was done after one week of the last therapy.

Results

Physical examination revealed discrete, irregular, slightly raised crusty, alopecic lesions on the nose, cheek, below the eyes of one kid and on the pinnae and neck of another kid. No other parts of the body showed any lesions on the skin (Table 1). There was also no evidence of clinical ringworm in adult female goats aged 4 and 5 years, respectively. Three members of animal owner's family (2 males aged 31 years and 7 years, 1 female aged 28 years) also failed to show dermatophytic infection.

Direct microscopic examination of the clinical mate-

Table 1. Clinical Observations of Dermatophytosis in Kids

Case	Breed	Age	sex	Distribution of lesions	Effect of treatment
A-1/91	Non-descript	2 months	M	Nose, cheek, below the eyes	Recovered
A-1/92	Non-descript	3 months	F	Pinnae of left ear and necks	Recovered

Table 2. Isolation of *T. mentagrophytes* from Skin Scrapings and Saprobic Materials

Source	Number examined	Number positive for pathogen	
		Isolation : Direct microscopy	
A : Animal			
1. Kid	2	2	2
2. Goat	2	—	—
B : Human			
1. Boy	1	—	—
2. Man	1	—	—
3. Woman	1	—	—
C : Environment			
1. Soil	3	—	ND

— : Pathogen was not isolated

ND : Not done

rial in KOH and DMSO wet mounts revealed slender septate hyphae with arthrospores (Fig. 1). The samples were negative for ectoparasites. The fungus could be isolated from 2 of the 7 specimens on sabouraud dextrose agar supplemented with chloramphenicol and actidione (Table 2). The cream coloured flat powdery colonies were noticed on mycological medium at 30°C (Fig. 2). No bacteria or actinomycetes could be recovered from any of the samples on blood agar. The culture in 'PHOL' stain showed many small, spherical/globose microconidia and few club shaped, smooth, thin-walled macroconidia.

None of the environmental samples were positive for *T. mentagrophytes*.

In vitro sexual stimulation test on the modified sunflower seed agar indicated that both the isolates of *T. mentagrophytes* were of '—' mt type.

Keratolytic activity of *T. mentagrophytes* was confirmed by the perforation of equine hair *in vitro*.

Both the affected kids were completely cured with topical application of 2% solution of tincture of iodine and hairs started growing. None of the goats exhibited any signs of toxicity such as erythema or pruritus etc. The skin scrapings after one week of last medication were negative for dermatophytes both by culture as well as direct microscopy.

Discussion

The detailed mycological investigation confirmed the etiology of caprine dermatitis as *T. mentagrophytes*. The infection was recorded in two young goats of 2 and 3 months old. The failure to report the disease in adult animals corroborate with the observations of earlier workers that dermatophytosis is more common in young goats of 2 to 12 months of age.^{2,5,10} Moreover, both the kids were kept in dark, humid, ill-ventilated and unhygienic byre. These environmental factors are known to predispose the animals to fungal infection.^{2,10}

Caprine dermatophytosis is chiefly caused by *T. verrucosum*.^{1,2,4-6,10,11,28} However, other dermatophytic fungi such as *Microsporum canis*,^{12,20} *M. gypseum*,²⁵

T. mentagrophytes^{8,9,20} and *Epidermophyton floccosum*²⁰ are also occasionally isolated from the cutaneous disorders of goats. The affected animals showed lesions on the face and neck region. However, in few cases generalized lesions involving limb, thigh, dewlep, bris-ket, coronet, abdomen, back, udder, tail, trunk, withers, loin etc. are also noticed.^{2,6}

T. mentagrophytes is a zoophilic pathogen which primarily infect the rodents. There are evidences to believe that wild and domiciliated rodents can transmit ringworm infection to animals as well as man.¹³ The presence of wild rodents in and around the goat pen is an indication that infection would have acquired from these rodents. However, on attempts were made to trap these rodents from the immediate environment of goats for investigating the presence of *T. mentagrophytes*. Interestingly, the fungus has been often isolated from the fur of rodents without apparent lesions.²⁷ Moreover, we could not detect the presence of the pathogen in soil by hair-bait technique.

A number of topical medicaments such as sodium hyposulfite, lime sulphur, captan, iodophor, white field ointment are commonly used as antimycotic drugs for the treatment of dermatophytosis.^{2,10,14} In the present, we have found that painting of individual lesions with a 2% solution of tincture iodine, after removal of the crust, for 2-4 weeks is very effective and, therefore, we advise the wider use of this less expensive drug in the field where a poor farmer can not afford costlier drugs.

Our experience has shown that a sample of skin scraping is always heated with 10-20% aqueous solution of potassium hydroxide for 3-5 minutes and then left at room temperature for 25-30 mts. However, a mixture of KOH and DMSO eliminate the need of heating the material and thereby can be recommended for direct microscopy particularly in remote areas where heating facilities are not available/limited. This will be very useful in field to establish the diagnosis of ringworm infection.

The public health significance of zoophilic dermatophytes is well documented in the literature.^{6,7,15,17,18,22,23,29} Surprisingly, in rural areas about 80%

of human dermatophytosis is contracted through the animals, which constitute the main reservoir.²⁾ It is therefore advised that veterinarians, veterinary assistants, animal owners and laboratory personnel should take adequate preventive measures while dealing with the diseased animal or the infected material. The isolation and treatment of the affected animal and sanitation of the environment will certainly prevent the cross infection and spread of dermatophytosis.

Acknowledgements : We are greatly indebted to Prof. Charles De Vroey, Institute of Tropical Medicine, Antwerp, Belgium, for providing standard tester strains of *Arthroderma simii* for genetic crossing experiment. The co-operation of the Veterinary Hospital staff and

animal owner is also thankfully acknowledged.

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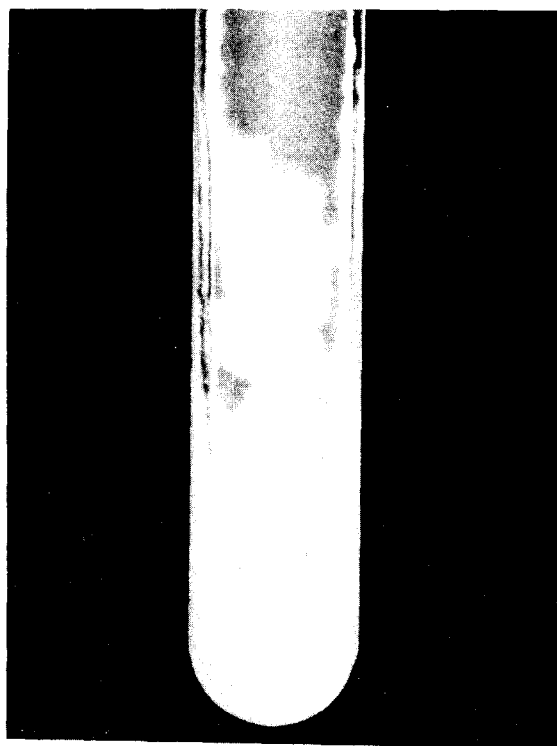
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Legends for Figures

Fig. 1. Slender, septate hyphae and arthrospores of dermatophyte in cutaneous lesions of a 3-month-old female goat. KOH and DMSO wet mount X 400.

Fig. 2. Three week old primary culture of *T. Mentagrophytes* at 30°C recovered from the skin scrapings of a 2-month-old kid on Sabourand dextrose agar supplemented with chloramphenicol and actidione.



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*Trichophyton mentagrophytes*에 의한 염소의 피부염

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요 약

습도가 높고 환기가 불량하며 비위생적인 우리에서 같이 사육한 두마리의 어린 염소에서 발생한 진균성 피부염의 일차원인이 *Trichophyton mentagrophytes*이었음을 보고하였다. 두 환축의 진단은 피부소파

시료에 KOH를 사용하여 균요소를 검출하고 30℃의 진균배지에서 순수배양하여 균을 분리하여 확인하였다. 한마리는 안면에서 나머지 한마리는 목과 귀에서 병변이 발견되었다. 같은 우리에서 사육중이던 두마리의 성측에서는 병변이 발견되지 않았다. 더욱이 염소의 주인과 주인가족들에서도 병변이 발견되지 않았다. 두 분리균주를 개량된 sunflower seed medium을 이용하여 유전적 교배실험을 한 결과 둘 다(-) mating type에 속했다. Hair performance test결과 두 균주는 모두 각질용해작용을 나타내었다. 공중위생학적인 중요성과 화학요법에 대해서도 고찰하였다. 감염경로에 대해서는 명확히 밝힐 수 없었다.
