

Occurrence of *Geotrichum candidum* in Two Cases of Canine Dermatitis

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Abstract : *Geotrichum candidum* was identified from 2 dogs among 52 dogs which had various dermatological problems. One was 5-month-old male Labrador and the other was 7-month-old female German Shepherd. The diagnosis was confirmed by direct microscopy of the specimen as well as cultured isolation of the fungus from the cutaneous lesions. The organism showed septate hyphae and rectangular to cylindrical arthrospores and no blastospores. Urea was not utilized and no assimilation of maltose was observed. Clinical improvement was occurred by application of 2% gentian violet and 2% miconazole solutions. It is suggested that this organism should be included in the differential diagnosis of canine dermatitis.

Key words : Canine dermatitis, *Geotrichum candidum*, PHOL stain

Introduction

Canine dermatitis is commonly encountered in clinical practice of small animals. The disease involves a variety of causes including dermatophytic and non-dermatophytic fungi^{4,11}. The available literature revealed a great paucity of information on cutaneous geotrichosis in dog^{7,9}. The present communication, therefore, describes the etiologic role of *Geotrichum candidum* in cutaneous lesions of a dog. In addition, the efficacy of PHOL stain for studying the morphology of the fungus is also reported.

Materials and Methods

Fifty two skin scrapings/biopsies/pus swabs collected and obtained from dogs of both sexes, various breeds and different age groups were investigated in the Laboratory of Veterinary Public Health for fungal infections. The age, sex, breed, presumptive diagnosis, site of lesions, drugs either applied or used orally or parenterally etc. were recorded for each patient. Each specimen was treated with 15% potassium hydroxide solution for 15-20 minutes for direct microscopic examination of the fungus.

Clinical samples were inoculated into the duplicate slant plates of Sabouraud dextrose agar with chloramphenicol (50 mg/L), Sabouraud dextrose agar and brain heart infusion agar. The inoculated media were kept at 25 and 37°C and examined daily for microbial growth. The morphology of the isolate was studied in PHOL stain which contained methylene blue (3%), glycerol 3.0 ml, formalin (4%) 5 ml⁶. The identification of the isolate was done by examining the cultured

morphological characteristics and performing biochemical test^{2,8}.

The animal was treated by local application of 2% miconazole and 2% gentian violet solution on the lesions daily for 15 days. No epidermiological investigation was done to establish the source of infection in the immediate environment of the affected dog.

Results

Geotrichum candidum infection could be diagnosed in two of the 52 dogs of different breed and both sexes (Table 1). Direct microscopical examination of the skin scraping in 15% KOH revealed rectangular to cylindrical arthrospores and septate hyphae morphologically simulating to *Geotrichum* organism. The clinical specimens were negative for ectoparasite, actinomycetes and dermatophytes. Both the affected had nodular erythematous skin lesions on the face and forelegs. The fungus grew as a dry, smooth to hairy, white to cream colored colonies on Sabouraud dextrose agar at 25°C, however, the growth was slow at 37°C. Interestingly, both the samples of skin scrapings failed to yield any bacterial pathogen on various microbiological cultural media employed for isolation. Micromorphological findings of both the fungal isolates in PHOL stain showed hyphae and arthrospores measuring 4-8 µm. There was absence of blastospores. Urea was not utilized and no assimilation of maltose was observed. The owners had informed that clinical improvement occurred by the application of 2% solution of gentian violet and 2% miconazole on the skin lesions. However, mycological response of the drug was not studied. Furthermore, epidermiological investigation to know the source of infection could not be conducted.

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Table 1. Clinical and mycological observations in canine dermatosis due to *Geotrichum candidum*

Case No.	Breed	Sex	Age in months	Lesions on the body	Diagnosis by:		Treatment
					Direct microscopy*	Isolation**	
16	Labrador	M	5	Face (Lt side of cheek)	+	+	Miconazole
43	German Shepherd	F	7	Rt upper fore leg	+	+	Gentian violet

*Demonstration of fungal elements in cutaneous lesions by potassium hydroxide technique.

**Recovery of *Geotrichum candidum* in pure and luxuriant growth from the clinical samples.

Discussion

Geotrichum candidum, a saprobic fungus, is rarely found to be associated with the cutaneous lesions in snakes, flamingos, dogs and man, gastrointestinal disorders of man, apes and dogs, pulmonary infections of human besides disseminated disease in dogs and man^{1,3,5,7,9,10,12}. The absence of dermatophytes and ectoparasites in the skin scrapings, direct detection of fungal elements in cutaneous lesions, isolation of the organism in pure growth and clinical response with gentian violet in one dog and miconazole in another dog indicated the etiologic role of *Geotrichum candidum* as a pathogen in the cutaneous lesions of both the dogs who had received broad spectrum antibiotics and cortisones therapy for dermatitis without any response. It is quite possible that these drugs would have predisposed the patients to fungal infection.

As the organism occurs as ubiquitous saprophyte in soil, fruits, vegetables, decaying organic matter, and dairy products^{2,5,8}, the fungus probably entered into the skin lesions of the dogs. Though *Geotrichum candidum* is an occasional opportunistic pathogen and may cause disseminated infection in immunocompromised patients, an early diagnosis and specific chemotherapy may be imperative for the management of disseminated disease. The systematic and comprehensive studies on the role of *Geotrichum candidum* as a potential and opportunistic pathogen in various clinical disorders of animals and humans may be rewarding. Further, the use of polymerase chain reaction for rapid detection of the pathogen in the diagnosis of geotrichosis should be explored. Unfortunately, this facility was not available in the department.

Conclusion

The occurrence and etiologic significance of *Geotrichum candidum* was studied in 52 dogs who had various dermatological problems. The diagnosis was confirmed in two dogs by direct microscopy as well as cultured isolation of the fungus from the cutaneous lesions. The morphology of the isolate was studied in PHOL stain. The topical application of 2% miconazole and 2% gentian violet in the lesion of 5-

month-old male Labrador and 7-month-old female German Shepherd, respectively showed good clinical response, however, no mycological follow up was possible to assess the efficacy of both the topical drugs. Though epidemiological investigation could not be conducted to know the source of infection, the fungus occurs as a saprobe in Indian environment. It is emphasized that detailed studies should be undertaken to elucidate the etiologic role of *Geotrichum candidum* in various clinical disorders of man and animals.

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References

1. Bendove RA, Ashe B. *Geotrichum* septicemia. Arch Intern Med 1952; 89: 107-110.
2. Chander J. A Textbook of Medical Mycology, New Delhi, Interprete. 1996.
3. Kassamali H, Anaisse E, Rolston K, Kantargian H, Fainstein V, Bodey GP. Disseminated *Geotrichum candidum* infection. J Clin Microbiol 1987; 25: 1782-1783.
4. Pal M. Isolation of *Microsporum canis* from man and dog. Arogya J, Hlth Sci 1981; 7: 125-127.
5. Pal M. Zoonoses. Delhi, India, RM Publishers. 1997: 168-170.
6. Pal M, Hasegawa A, Ono K, Lee CW. A new staining solution for the morphological studies of fungal and Prototheca. Jpn J Vet Sci 1990; 52: 527-531.
7. Rayan JC, Stackhouse LA, Davis EG. Disseminated geotrichosis in two dogs. J Am Vet Med. Asso 1990; 197: 358-360.
8. Ribbon JW. Medical Mycology. The pathogenic fungi and actinomycetes, Philadelphia WB Saunders. 1982: 642-645.
9. Siddu RK, Singh KB, Jand SK, Joshi DV. Cutaneous geotrichosis in a dog and its handler-A case report. Ind J Anim Hlth 1993; 32: 75.
10. Spanoghie L, Devos A, Vianene N. Cutaneous geotrichosis in the red flamingo (*Phoenicopterus ruber*). Sabouraudia 1976; 14: 37-42.

1. Van Cutsem J, Rochette F. Mycoses in Domestic animals. Beerse, Belgium: Janssen Research Foundion. 1991.
12. Webster BH. Bronchopulmonary geotrichosis. A review with a report of four cases. Dis Chest 1959; 35: 273-281.

두 마리 개의 피부염에 있어서 *Geotrichum candidum*의 존재

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요 약 : 다양한 피부병을 갖고 있는 52두의 개에 대해 *Geotrichum candidum*의 감염율을 조사하였다. 피부가검물은 15% KOH용액으로 케라틴을 용해한 후 현미경으로 직접 검사하였다. 또한 Sabouraud dextrose agar, chloramphenicol을 함유한 Sabouraud dextrose agar 및 brain heart infusion agar에 피부가검물을 접종하여 25°C와 37°C에서 배양하여 원인균을 배양하고, 배양물을 현미경으로 검사하였다. 52두 중 2두의 가검물에 대한 직접 현미경 검사에서 직사각형 내지 원기둥형의 분절포자와 격벽이 있는 균사가 관찰되어 *Geotrichum* 감염이 제시되었다. 이 가검물의 배양물에서 균사와 4-8 µm의 포자가 관찰되었다. 또한 이 진균은 분아포자를 생성하지 않고, 요소의 이용과 맥아당의 동화작용을 나타내지 않았다. 이 두 마리의 피부염은 2% gentian violet 또는 2% miconazole의 국소적용에 임상적인 차이를 나타내었다. *Geotrichum candidum*은 사물기생성 진균이지만 개에 있어서 피부염의 원인이 될 수 있기 때문에 피부염 감별진단에 포함시켜야 할 것임을 제시하였다.

주요어 : 개, 피부염, *Geotrichum candidum*