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Dermatophytosis in a Barking Deer Due to *Trichophyton verrucosum*

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우는 사슴에 있어서 *Trichophyton verrucosum*에 의한 피부사상균증

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요 약 : 인도의 아메다바드 동물원에서 사육중인 1년생의 수컷 우는 사슴(*Muntiacus muntjak*)에서 피부사상균증이 발생했다. 발병된 사슴의 얼굴, 머리 및 목 부위 피부에는 모양이 불규칙하고 각피성인 여러개의 회백색 병변을 나타내었다. potassium hydroxide기법에 의해 피부병변에서 *Trichophyton verrucosum*이 검출되었다. 감염된 피부와 털 시료를 곰팡이 배지에 배양하여 같은 병원체가 검출되었다. 이 사슴과 밀접하게 접촉하였던 사육사에게서는 감염증이 확인되지 않았다. 동물원 동물의 피부염을 감별하는데 있어서 피부사상균을 고려해야 한다는 점이 강조되었다. 저자들의 소견으로는 이것이 인도산 우는 사슴에서 발생한 Trichophyton verrucosum 감염증으로써 최초의 확진된 보고이다.

Key words **:** *Trichophyton verrucosum, barking deer, Muntiacus muntjak, dermatophytosis*

Introduction

Dermatophytosis, the common cutaneous mycosis of man and animals is important from public health and economic point of view[2,4,13,14,16,17]. The disease is caused by dermatophytes which attack keratinized layers of the skin, hair, nail and horn. The infection can be transmitted by direct and indirect contact, and occurs in sporadic and epidemic form[4,8]. The perusal of available literature reveals a great paucity of information on dermatophytosis in zoo animals[3,5]. The present paper reports natural infection due to *Trichophyton verrucosum* in a young male barking deer (*Muntiacus muntjak*) from India.

Materials and Methods

Samples of skin scrapings along with hairs collected from the active borders of the lesions on the face of the diseased deer were submitted to the laboratory of Veterinary Public Health. Specimen was also obtained from a zoo worker who was in close contact with the affected animal. A portion of the each sample was mounted in a mixture of 5 ml dimethyl sulfoxide (DMSO) and 5 ml (20%) potassium hydroxide and examined under microscope for ectoparasite and fungi. The remaining deer sample from the face was treated with cycloheximide and chloramphenicol to make them free from contamination and later culture on to 2 plates and 2 slants of sabouraud glucose agar supplemented with chloramphenicol (0.05 mg/ml) and actidione (0.5 mg/ml). These were incubated at 25 and 37°C and examined daily up to 4 weeks before being considered as negative.

Two soil samples obtained from the immediate environment of the deer were screened mycologically for the fungus.

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Treatment was attempted by regular use of 2% solution of tincture of iodine for 3 weeks on individual lesion after removing the crust with plastic brush.

The detailed examination of the isolate was done in a recently discovered 'PHOL' stain[11]. The new stain contained 0.3 ml of 3% aqueous solution of methylene blue, 3 ml of glycerol and 5 ml of 4% aqueous solution of 35% formaldehyde. The isolate was identified as per the procedure recommended by Baxter and Rush-Munro[1].

Results

The affected 1-year-old male deer (*Muntiacus muntjak*) showed greyish-white crusty lesions on the skin of face, head and neck. There was no previous history of any trauma, laceration or injury. The animal had normal appetite, urination and defecation. The hairs on the lesions were britle and few were broken giving a picture of mild alopecia. The attendant working with the diseased deer did not exhibit any signs of ringworm infection.

The infected hairs under woodlamp failed to exhibit fluorescence. Microscopic examination of the infected clinical specimens in a solution of DMSO and KOH showed the presence of fungal hyphae and arthrospores characteristic of dermatophytes (Fig. 1). None of the material was positive for mange mites.

The isolation of the fungus was attempted only from a solitary specimen collected from the face of the male deer. The pathogen was recovered from the face of the male deer. The pathogen was recovered from the cutaneous lesions of the animal on mycological medium after 2 weeks of incubation. The microscopic morpohology of the isolate in 'PHOL' stain confirmed the identity as *Trichophyton verrucosum*[1]. In addition, few fast growing saprophytic molds were also cultured from the specimen in one of the slants and were discarded as contaminants. The fungus was neither isolated from the healthy skin of the zoo attendant nor from the soil samples.

The animal showed remarkable clinical improvement with topical application of tincture of iodine. No relapse or side effects of the drug was observed when inquired after one month of the treatment.

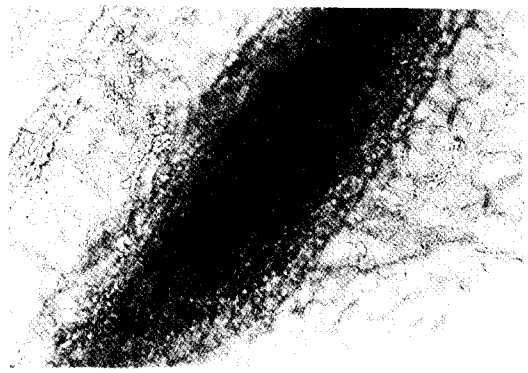

Fig 1. Photomicropraph showing dermatophyte in the skin lesion of a caged 1-year-old male barking deer. KOH and DMSO wet mount x200.

Discussion

The typical clinical signs, failure to detect mange mites in the infected skin crusts, direct demonstration of dermatophyte in the cutaneous lesions and recovery of the pathogen in culture conclusively proved that barking deer had cutaneous mycosis due to *Trichophyton verrucosum*. The earlier investigators also employed the similar/same criteri for establishing the diagnosis of dermatophytosis in man as well as animals[6,8,9,12,17].

Trichophyton verrucosum affects a wide variety of animals including man[4,6,8,13]. The infection causes damage to the skin and hide resulting into considerable financial losses to the animal industry. However, the correct diagnosis and prompt chemotherapy can prevent such losses. It is therefore, suggested that direct microscopy of the clinical specimen in a mixture of DMSO and KOH in remote/field areas where cultural facilities are not easily available, will be very useful to give presumptive diagnosis of mycotic dermatitis.

Since the dermatophytes has a tendency to grow centrifugally, attempts should be made to obtain the skin scrapings from active borders of the recent lesions. Furthermore, contamination of the samples

can be minimized by thoroughly sterilizing the cutaneous lesions, scalpel and hand with 70% alcohol. The specimen should be treated in a solution of chloramphenicol and actidione and later inoculated into four slants.

There are ample evidences where diseased animals served as primary source of infection to human contact is in confirmity with the findings of Gugnani (1972)[6] and Pal (1987)[8] who could not observe *Trichophyton verrucosum* infection in animal handlers occupationally exposed to diseased cattle. Presently no plausible explaination can be given to this observation that why infection could not be transmitted from diseased animals to man when later had enough opportunity to remain in contact with zoophilic fungi. Whether a breach in skin by minor trauma, injury, laceration is a predisposing factor in the acquisition of dermatophytic infection needs further elucidation. Nerertheless, diseased animals should be handled carefully to avoid further spread of disease to the susceptible animal and man.

The source of infection could not be established, as soil samples collected from the immediate environment of diseased deer failed to demonstrate the presence of *Trichophyton verrucosum*. However, a recent study reported the recovery of *Trichophyton verrucosum* from soil in cattle breeding environment of Japan[15].

Conclusion

Dermatophytosis has been recorded in a one-year-old male barking deer (*Muntiacus muntjak*) kept in a zoo of Ahmedabad, India. The affected deer showed many irregular, crusty, greyish-white lesions on the skin of face, head and neck. *Trichophyton verrucosum* was detected in the cutaneous lesions by potassium hydroxide technique. The pathogen was also recovered from the infected skin and hair specimens on mycological medium.. The infection was not recorded in the animal attendant who was in close contact with the diseased deer. It is emphasized that dermatophytosis should be considered in the differential diagnosis of dermatitis in zoo animals. In authors' view this is the first authenticated report of *Trichophyton verrucosum* infection in a barking deer from India.

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