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A Case of Feline Ringworm by *Microsporum canis* in Korea

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*Microsporum canis*에 의한 고양이의 백선증

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초록 : 진주 시내에서 사육중이던 생후 3개월령의 숫고양이 1두에서 발생한 백선증의 임상소견 및 원인균을 조사하였던 결과는 다음과 같다.

환축은 눈, 코주위 및 후지에 심한 원형탈모와 회백색의 가피병변을 나타내었으며 귀, 목, 복부에서도 피부병변이 관찰되었으나 부정형의 부분적 탈모 및 백색의 인설형성 소견이었다.

병변부로부터 채취된 털과 가피에 대하여 직접현미경검사 및 배양검사를 실시하였으며 분리된 원인균은 *Microsporum canis*로 동정되었다.

Introduction

Feline ringworm is the superficial mycosis depreciating the skin value of pet cat and may be of zoonotic importance due to transmission to persons in close contact(Weiss and Weber, 1983; McAleer, 1980). It is occurred mainly by *Microsporum canis*(*M. canis*) while *M. gypseum*, *M. audouinii*, *M. cookei*, *Trichophyton mentagrophytes*(*T. mentagrophytes*), *T. schoenleinii* and *T. terrstre* have also been condemned as the etiologic organisms(Kristensen and Krogh, 1981; Moe, 1980; Baxter, 1973; Jungerman and Schwartzman, 1972).

In Korea, Choi(1979) first reported the feline ringworm induced by *T. mentagrophytes*, and further surveys on the disease caused by another species of dermatophytes are needed in order to prevent and control it.

The present study was performed to investigate the causative organism and the clinical features in a cat affected by ringworm in Chinju, Korea.

Materials and Methods

Cat examined: The animal offered for the examination was a mixed-breed, male cat aged 3 months. Clinical features of the patient cat were observed, and specimens of the hairs and crusts were taken aseptically from the lesions and brought back to the laboratory for immediate mycological examinations.

Mycological examination: Isolation of dermatophyte from the specimens and identification of the isolate were carried out by the methods of Jungerman and Schwartzman(1972) and Campbell and Stewart (1980).

The hairs and crusts were mounted in 10% KOH and examined microscopically for the presence of

fungal elements. For the isolation of dermatophyte, part of the specimens was cultured on Sabouraud's dextrose agar(Difco Laboratories, USA) containing chloramphenicol (0.05mg/ml; Sigma Chemical Co., USA) and cycloheximide (0.5mg/ml; Wako Pure Chemical Industries Ltd., Japan) at 25°C. Gross and microscopic characteristics of the fungal isolate were observed through giant culture and slide culture on potato dextrose agar(Difco Laboratories, USA) for 1 to 2 weeks at 25°C, and lactophenol cotton blue stain was used for the microscopic preparation of the culture.

Results

In the clinical examination, the patient cat showed pruritic skin lesions around the eye, nose, neck, abdomen and posterior limb. Alopecia and thick, greyish white crusts were noticeable at the lesions of the eye, nose and posterior limb while partial loss of hairs in irregular shape and white scales were observed in the ear, neck and abdomen lesions(Fig. 1, 2, 3, 4).

Sheaths of arthrospores at base of the hairs(Fig. 5) and clusters of arthrospores in the crusts(Fig. 6) were observed in 10% KOH mounts, and the causative dermatophyte was isolated from these specimens 3 days after culture on Sabouraud's dextrose agar at 25°C.

In giant culture of the isolate on potato dextrose agar at 25°C, the colony was at first white and fluffy but later its surface became buffy with yellow pigment in periphery. Hyphae grew radially, then the entire surface of the colony, 80mm in diameter, was covered with closely spaced tufts of hyphae and was rather flat at the end of 2 weeks' incubation(Fig. 7). The reverse was yellow with brownish yellow center.

In microscopic examination of the isolated strain after slide culture on potato dextrose agar for 7 days at 25°C, septate hyphae with chlamydospores and numerous macroconidia were recognized(Fig. 8, 9). The macroconidia were spindle-shaped with curved and knob-like ends and had 6 to 11 comparted cells inside. The walls of the macroconidia were thick and verrucous(Fig. 10).

Discussion

The patient cat revealed alopecia or partial hair loss with scaling on body surface from which pruritus was apparent. These features were distinctive as the skin lesion of feline ringworm described in elsewhere(Kristensen and Krogh, 1981; McAleer, 1980; Moe, 1980). The clinical diagnosis of ringworm, however, should be confirmed in the laboratory by direct microscopic examination and culture(Pepin, 1968), which enables to discriminate the ringworm from other skin diseases or the species of causative dermatophyte itself from others even in the ringworm case.

In the direct microscopic examination, fungal elements were observed in KOH mounts of the hairs and crusts, and the causative dermatophyte was isolated rapidly from these specimens.

In colonial color and texture during giant culture, the isolate was white to buff and fluffy to flat with tufts of hyphae closely arranged on the surface. These gross appearance of the isolate was agreed to the characteristics of *M. canis* which can be differentiated by its colonial pigmentation from other *Microsporum* species such *M. gypseum*, *M. cookei* and *M. audouinii* as occasional etiology of feline ringworm(Jungerman and Schwartzman, 1972). In mature colony, *M. gypseum* is pinkish tan or reddish brown with white hyphal border and center, *M. cookei* is yellow or dark tan with white periphery, and *M. audouinii* is grey or tannish white to brown. The colonial color and texture in different strains of the same dermatophyte species sometimes, however, are unlike in accordance with various culture condition. Therefore, microscopic observation on the fungal elements of the isolate is necessary and one of the reliable methods in interspecies or intergenus differentiation of dermatophytes(Caprill *et al.*, 1971; Ajello, 1968; Pepin and Austwick, 1968).

The spindle—shaped macroconidia with knob-like ends were recognized in slide culture preparation of the isolate. Also the macroconidia had 6 to 11 cells inside and thick and verrucous walls. The microscopic morphology of the isolate was corresponded to that of *M. canis*(Ichijo *et al.*, 1982; Campbell and Ste-

wart, 1980). In comparison with macroconidial appearance of *M. canis*, *M. audouinii* rarely has the macroconidia and even in such a case, there are a central constriction and 5 to 6 cells in the bizarre-shaped macroconidia. The macroconidia of *M. gypseum*, having 3 to 9 cells with no more than 6 cells mostly, are shorter and broader than those of *M. canis* and their ends are round. *M. cookei* produces elliptical macroconidia with approximately 5 to 8 cells inside. Also most of *Trichophyton* spp. are readily distinguished by their thin- and smooth-walled macroconidia from *Microsporum* spp.

From the results in mycological examinations, the isolated dermatophyte was identified as *M. canis* and the present paper seems to be the first report on feline ringworm due to *M. canis* in Korea.

Summary

Attempts were made to determine the clinical features and the causative organism of ringworm occurred in a cat in Chinju city, Korea.

Alopecia and greyish white crusty lesions were observed around the eye, nose and posterior limb while irregular, partial loss of hairs and white scales were in the ear, neck and abdomen lesions.

Direct microscopic and cultural examination were carried out for the hairs and crusts taken from the skin lesions, and the causative organism was identified as *M. canis*.

Legends for Figures

Fig. 1. Greyish white crusty lesions with alopecia around the eye and nose.
Fig. 2. Partial loss of hairs in irregular shape and white scales under the neck.
Fig. 3. Partial loss of hairs in irregular shape and white scales on the abdomen.
Fig. 4. Greyish white crusty lesion with alopecia on the posterior limb.
Fig. 5. Sheath of arthrospores at base of the hair from the skin lesions observed in 10% KOH mount, ×400.
Fig. 6. Clusters of arthrospores in the crust from the skin lesions observed in 10% KOH mount, ×400.
Fig. 7. Buff-colored colony of *M. canis* with yellow pigment in periphery covered with tufts of hyphae, potato dextrose agar, 25°C, 2 weeks.
Fig. 8. Septate hyphae and chlamydospores of *M. canis*, potato dextrose agar, 25°C, 7 days, ×400.
Fig. 9. Spindle-shaped macroconidia of *M. canis* with curved and knob-like ends(arrows) having 6 to 11 cells inside, potato dextrose agar, 25°C, 7 days, ×400.
Fig. 10. Thick and verrucous walls of macroconidia of *M. canis*, potato dextrose agar, 25°C, 7 days, ×1,000.

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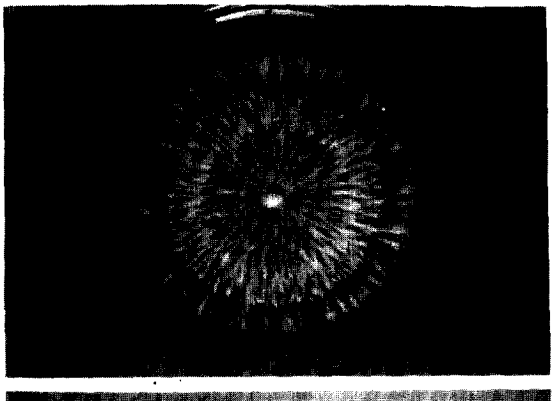

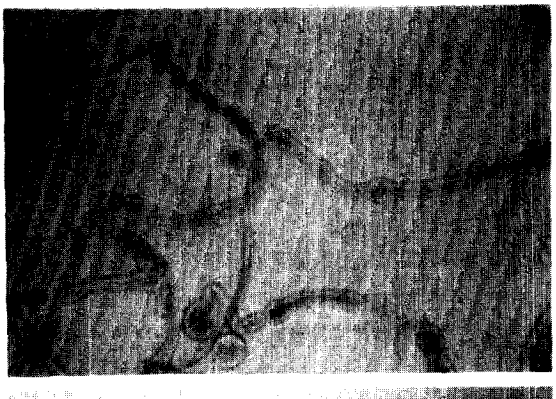

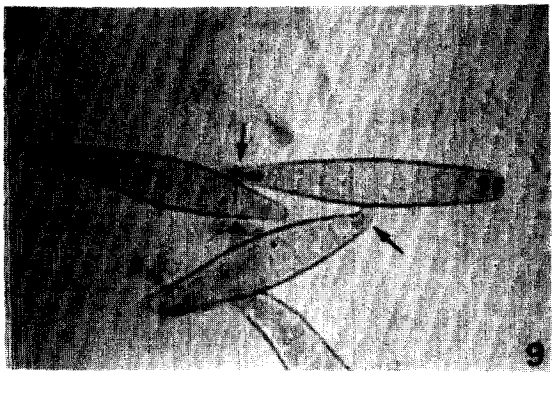

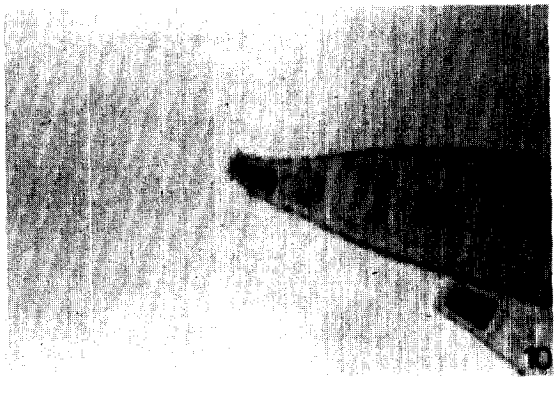

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