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MICROSPOROSIS IN ORANGUTANS AND GORILLAS

Die Kleintier-Praxis

(Small Animal Veterinary Praxis)

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Summary: A case of microsporidia caused by *M. canis* in an anthropoid ape stock is discussed; two young orangutans, two young gorillas, and an animal keeper suffered from the disease. Two gorillas, a chimpanzee, and an orangutan -- all cage-mates of the infected animals -- as well as an adult chimpanzee and another animal keeper were latent carriers of *M. canis*. Transfer of the infection from one cage to another could be attributed to the animal keepers.

Even in the case of itching eczemas of apes, one should consider mycosis and start with appropriate tests. In the case of cutaneous fungus infection, one should prevent the spread of infection to other animals and animal keepers by intensive treatment.

In the case of apes suffering from cutaneous fungus infection, microspore (M.)-types have been found almost exclusively to cause the infection. Hoffmann (1928) described a skin disease of the macaque monkey which was probably caused by an achorion (*microsporum*) *gypseum*. Mulzer and Nothass (1928) reported on a microsporosis case in a latently syphilitic rhesus monkey, which had been caused by an *M. audouinii* modification. Hasegawa and Yamamoto (1936) isolated *M. fulvum* (which on the basis of the tests made by Stockdale must no longer be regarded as a synonym

of M. gypseum) from several monkeys. Conant (1937) mentions the isolation of M. simiae (M. canis) by Emmons from an unidentified monkey. Scully and Kligman (1951) grew M. audouinii from a capuchin monkey and from several persons infected by it. Menges and Georg (1957) isolated M. canis from six monkeys; Kaplan and co-workers (1957 and 1958) found among 21 diseased monkeys ten infected with M. canis and four infected with M. distortum. Eight of these animals were assumed to have infected humans. Doupagne (1960) showed the occurrence of Sabouraudites (Microsporum) canis in a Colobus polikomos. Bisping and Seeliger (1962) as well as Seeliger and co-workers (1963) could isolate a M. canis variant from Kappen-Gibbon apes. Likewise, Kaben (1963) demonstrated a M. canis variant in white-hand gibbon monkeys. Klokke and de Vries (1963) found in two chimpanzees a M. canis of the M. obesum-type. Refai and Bisping isolated, from sent-in samples of 13 monkeys suspected of dermatomycosis, M. canis in four cases. Janisch and Koch (1964) grew M. gypseum from rhesus monkeys. Trichophytes, on the other hand, appear to be rarer in monkeys (Pinoy 1912, Castellani and Chalmers 1919, Emmons 1940, and Stockdale and co-workers 1965).

An enzootia in orangutans (Pongo pygmaeus) and gorillas (Gorilla gorilla) of a zoological garden, which was caused by M. canis, will be described. As far as I know, dermatomycosis in these types of animals has not yet been described. The studies made in connection with this enzootia ranged over the time period from January 1965 to February 1966.

Clinical and Epidemiological Tests

In an ape group consisting of three orangutans (1 ♂, 2 ♀) aged three to five years and a female chimpanzee aged two-and-a-half, a dry eczema had developed at three sites on a three-year-old orangutan. At the back of the head was a round bald spot, as large as the palm of a hand, covered with asbestos-colored scales (Fig. 1). There were additional sites of this type on the face (Fig. 2), with similar small spots below the chin and in the region of the temple. On the upper arm (Fig. 3), upper thigh, and chest, several round or oval sites of 2-3 cm diameter covered with loose, large scales were observed. No indications of an acute, inflammatory defense reaction such as reddening or swelling on the edge of the efflorescences, could be observed. There appeared to be no itching sensation.

The sites did not fluoresce under a Wood's light. According to statements by attendants, the first scaly changes were observed on the head of the animal three months prior to the study. The four-year-old male orangutan had at the back of his head several afflorescences of 2-4 cm diameter, which were very similar to those on the head of the female. This ape did not appear to suffer itching sensations either. The third orangutan and the female chimpanzee did not exhibit skin changes. Nevertheless, the animal keepers claimed that six months prior to setting up the ape group they had observed a round tetter which disappeared without treatment. M. canis was detected in the scales from the altered skin of all infected animals and in skin samples from healthy spots of all four animals. After three weeks of therapy* with a griseofulvin preparation when symptoms in both diseased animals improved only moderately, M. canis was again detected on the diseased animals. After a second three-week treatment, no cutaneous fungus could be detected on the orangutan, which had been most seriously afflicted, nor on the chimpanzee. The other two animals had been taken away in the meantime. A 1 percent solution of Lysoformin (Lysoform Company) was used as scrubbing disinfectant.

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Fig. 1 Dry eczema on an orangutan,
caused by M. canis

Fig. 2 Asbestos-like eczema of half
the face (as in Fig. 1)

Fig. 3 Microspore accumulation on
the upper arm (as in Fig. 1)

*The therapy was performed by Dr. P. Brandt of the Clinic for Small Domestic Animals, Veterinary Institute, Hanover (Director: Prof. Dr. J. Brase).

In addition to other apes, a group of three gorillas (2♂, 1♀) aged 2-3 years was also housed in the dwelling. Three months after an initial examination when these animals were judged clinically healthy and no cutaneous fungi were detected in cultures, skin alterations were observed on two of the animals; these changes were similar to those of the orangutan, but they were less pronounced with respect to healthy areas. M. canis could be isolated from all three monkeys at healthy skin sites and from the clinically infected animals at unaffected skin sites. In the case of these animals also, two griseofulvin treatments were required for complete disappearance of the cutaneous fungi.

Between the animal attendants and all the young animals there existed the usual close contact prevailing during raising of apes (the animals climbed over the animal keepers, looked for "fleas" in the persons' hair, etc.). On the occasion of my first visit, none of the three keepers exhibited any symptoms indicating the possible occurrence of cutaneous fungi; however, two of the attendants complained about itching of the skin on the skull and pronounced dandruff formation. The initial mycological examination of hair samples and dandruff from the attendants was negative in two cases. In the third case (D.), M. canis was detected.

A repeat examination of hair and dandruff from the heads of all three attendants after three weeks, and in addition of attendant D. after five weeks, was negative. One of the attendants had meanwhile developed eczema at the inside of the left upper arm, at a site approximately 3 cm wide, round, dry, slightly flushed, covered with scales, and itching. M. canis could be isolated from the scales. The eczema healed up rapidly under the care of a physician.

During the enzootia, M. canis could in one case be detected on a clinically healthy, adult chimpanzee. Nevertheless, none of the older animals became infected, even when they had the opportunity to enter the cage of the infected young animals.

Mycological Studies

The mycological studies included testing of hair samples and skin from 36 apes. Five hair samples were obtained from the zoological garden from which the two-and-a-half-year old female chimpanzee had been taken. All in all, the apes included 30 young animals and 6 adult animals. Repeated samples from healthy and infected sites on the

diseased apes and on those kept with them in the same section of the animal house were taken and studied. Moreover, hair collected from the floor of the cage was examined.

M. canis was detected on eight of the 36 animals (the four-animal group, the three-animal group, and the adult female chimpanzee) and in the samples from the floor of the cage. Moreover, hair from 65 other apes in the zoological garden (primarily gibbons, pavians, and macaques) from another ape house and monkey colony was investigated. The hair had either been epilated from various body parts or, when that was not possible, collected from the floor of the cage. These animals did not exhibit skin alterations indicating the presence of M. canis; only a single colony of Trichophyton terrestre was detected in the hair from one of the cages. The shepherd dog of the animal keeper who was infected with microsporia was also studied; this dog had been ill three months earlier with a dermatosis which healed. A rat from the monkey house was mycologically investigated also. No M. canis could be detected on these animals.

All samples were studied in the laboratory with a Wood's lamp for fluorescence phenomena and in the potassium hydroxide preparation for skin fungi. The culture was grown on fungi agar according to Grutz and Kimmig (test agar) with the addition of penicillin, streptomycin, and actidione at 28° C. The diagnosis of M. canis was arrived at on the basis of the following test results:

The investigation under Wood's light was negative for all samples. In the case of the monkeys, rims consisting of small spores were detected only on a few hairs in the softened crusts of the three-year-old female orangutan. Numerous fine nonseptate hyphens were found on the skin scales from the arm of the infected animal keeper.

Radiant fungus growth was observed on the culture plates from almost all the inoculation sites by the third day. The only exceptions were the cultures prepared with material from keeper D. and from the adult female chimpanzee because the fungus grew in these cases only at three or one of the 15 inoculation sites. After a week the rapidly growing colonies already had a diameter of 2-3 cm. The topside was covered with white or yellow, woolly, aerobic micelle growth. The underside exhibited a lemon-yellow to orange pigment after a relatively short period. The tendency of the individual strains to become pluromorphic in the subculture on test agar was strongly but differently

pronounced. Subcultures on glucose, peptone, and soil agar did not yield any special results in comparison with the main cultures.

In the microscopic examinations of the original cultures, the spindle-shaped macroconidia characteristic of M. canis were formed, whereas microconidia occurred only in isolated instances. Infection could be stopped in five of nine guinea pigs which had been scarred with culture material from a part of the strains by means of sandpaper. Even after 14 days, M. canis could be isolated from skin changes. Two "blanks", control animals which had been scarred though not with fungus material, exhibited very slight inflammatory symptoms which healed up within ten days. According to Conant, a partially yellow and partially brown pigment was formed on rice grains*.

Discussion of the Findings

The origin of the described M. canis enzootia could not subsequently be explained. Therefore, it is not certain whether the eczema which had been previously observed by the animal keepers on the chimpanzee of the first infected group was caused by M. canis and must be regarded as the origin of the enzootia. The mycological examination given to all apes immediately after discovery of M. canis answered the question whether or not perhaps part of the animals had been latently afflicted with M. canis because it is known since the studies by Refai and Bisping that a high percentage of animals latently infected with skin fungi must be expected. Since, with the exception of the adult female chimpanzee in the neighboring cage of the mixed four-animal group, no M. canis was detected in this serial examination of the other apes performed at the beginning of the enzootia, it was possible to exclude a latent infection of the entire stock. Therefore, the subsequent cases of infection in the group of three young gorillas must have been caused by fungus spores from the cage of the four-animal group. Transfer must be attributed primarily to the animal keepers. This could be affirmed also by a culture of head hair from animal keeper D. The fact that D. did not clinically develop a microsporia of the scalp can be explained by the relatively low sensitivity of the human scalp to M. canis infections (Gotz 1962). When a microsporia subsists in an ape stock, it should be brought to the attention of the animal keepers that they can infect themselves and other apes by playing with infected animals.

* See also K. H. Bohm, "Microsporum canis enzootia in a group of wild animals with a study of the differential-diagnostic value of the rice grain nutrient agar," Die Kleintier-Praxis, in the press.

The observation that no microsporia developed in a single adult ape during the enzootia agrees with the findings made with cats and dogs, according to which primarily young animals were infected with M. canis.

Because of the absence of acutely inflammatory defense reactions in the rims of the infected major parts of the apes, no itching existed as described by almost all researchers concerned with microsporia-infected apes. This also explains the fact that the suspicion of dermatomycosis arose only relatively late after an animal had supposedly exhibited skin changes for three months. The clinical picture of dermatomycosis can easily be mistaken for non-infectious skin changes, as was shown by a bald spot on the head of a newly-arrived gorilla, which according to the previous animal keeper had existed for years. The difficulties in recognizing microsporias have been pointed out also in the case of other animal species (dog and cat) by Arndt (1962) and by Rieth and Dreisorner (1963). Consequently, even in the case of slight skin changes in apes, a mycosis should be considered and corresponding examinations should be started. The infected apes should be treated until fungus spores can no longer be detected in the culture.

BIBLIOGRAPHY

Arndt, J. (1962): "Extent, diagnosis, and therapy of mycoses observed with cats," Praxisforum Hamb.Derm.Ges., 11 August 1962, cited according to H. Rieth and H. Dreisorner (1963).

Bisping, W. and H.P.R. Seeliger (1962): "Microsporum audouinii infection of a Kappen-Gibbon (Hylobates lar.)," Mykosen, Vol. 5, pages 33-37.

Castellani, A. and A. J. Chalmers (1919): Man.Trop.Med. 1023, cited according to C. W. Emmons (1940).

Conant, N. F. (1937): "Studies in the genus microsporum," Arch. Dermat. Syph., Vol. 36, pages 781-801.

Doupagne, P. (1960): "Sabouraudites canis on a Colubus polikomos monkey from Ituri," Ann. Soc. Belg. Med. trop., Vol. 40, pages 399-902.

Emmons, C. W. (1940): "Trichophyton mentagrophytes (pinoyella simil) isolated from dermatophytosis in the monkey," Mycopath., Vol. 2, pages 317-321.

Gotz, H. (1962): In A. Marchionini and H. Gotz, Die Pilzkrankheiten der Haut durch Dermatophyten. Handbuch der Haut-und Geschlechts-krankheiten. Erg.-Werk IV/3 (Fungus Diseases of the Skin Caused by Dermatophytes. Handbook of Skin and Venereal Diseases. Supplement IV/3). Springer-Verlag, Berlin-Göttingen-Heidelberg, pages 234-240.

Hasegawa, M. and M. Yamamoto (1936): "A fungus grown on monkeys: *Microsporum fulvum*," Jap. J. Dermat., Vol. 39, 23, cited according to Koch and Janisch (1964).

Hoffmann, H. (1928): "A fungus disease in monkeys, probably caused by *Achorion gypseum*," Dermat. Wschr., Vol. 86, pages 353-354.

Kaben, U. (1963): "Griseofulvin therapy of a white-hand gibbon infected with microsporia," Hefte Vet. med., Vol. 17, pages 667-670.

Kaplan, W., L. K. Georg, S. L. Hendricks, and R. A. Leeper (1957): "Isolation of *Microsporum distortum* from animals in the United States," J. invest. Dermat., Vol. 28, pages 449-453.

Kaplan, W., L. K. Georg, and L. Ajello (1958): "Recent developments in animal ringworm and their public health implications," Ann. N. Y. Acad. Sci., Vol. 70, pages 636-649.

Klokke, A. H. and G. A. De Vries (1963): "Tinea capitis in chimpanzees caused by *Microsporum canis* Bodin 1902 resembling *M. obesum* Conant 1937," Sabouraudia, Vol. 2, pages 268-270.

Koch, H. A. and W. Janisch (1964): "A *Microsporum gypseum* enzootia in rhesus monkeys (*Macacus rhesus*)," Mykosen, Vol. 7, pages 86-89.

Kral, F. (1955): "Classification symptomatology and recent treatment of animal dermatomycoses (ringworm)," J. Amer. Vet. Med. Ass., Vol. 127, pages 395-402.

Menges, R. W. and L. K. Georg (1957): "Survey of animal ringworm in the United States," Publ. Health Rep., U. S. Dept. of Health, Education and Welfare, 72, 503-509.

Mulzer, P. and R. Nothaas (1926): "On a case of extended microsporia on the skin of syphilitic monkeys," Wien. med. Wschr., Vol. 70, pages 912-914.

Pinoy, E. (1912): "Epidermophyton of the monkey," Bull. Soc. Path. Exotique, Vol. 5, pages 60-63.

Refai, M. and W. Bisping (1964): "The occurrence of cutaneous fungi on monkeys," Kleintierpraxis, Vol. 9, pages 147-150.

Rieth, H. and H. Dreisorner (1963): "Dermatomycoses in dog and cat," Kleintierpraxis, Vol. 8, pages 94-96.

Scully, J. P. and A. M. Kligman (1951): "Coincident infection of a human and an anthropoid with *Microsporum audouini*," Arch. Dermat. Syph., Vol. 64, pages 495-498.

Seeliger, H. P. R., W. Bisping, and H. P. Brandt (1963): "A microsporum enzootia in Kappen-Gibbons (*Hyllobates* lar.) caused by a variant of *Microsporum canis*," Mykosen, Vol. 6, pages 61-68.

Stockdale, Ph. (1963): "The *Microsporum gypseum* complex (*Nannizzia incurvata*, stockd., *N. gypsea* (Nann.) Comb. nov., *N. fulva* spec. nov.)," Sabouraudia, Vol. 3, pages 114-126.

Stockdale, Ph. M., D. W. R. Mackenzie, and P. K. C. Austwick (1965): "*Arthroderma simii* sp. nov., the perfect state of *Trichophyton simii* (Pinoy). Comb. nov.," Sabouraudia, Vol. 4, pages 112-123.