

RH: DERMATOPHYTE INFECTIONS IN FLORIDA PANTHERS

DERMATOPHYTE INFECTIONS IN FREE-RANGING FLORIDA PANTHERS (FELIS CONCOLOR
CORYI)

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Abstract: Three free-ranging Florida panthers (*Felis concolor coryi*), were diagnosed with clinical dermatophytosis; two from *Trichophyton mentagrophytes* and one from *Microsporum gypseum*. These included two male juvenile panthers that were diagnosed with *M. gypseum* and *T. mentagrophytes*. These animals were not treated for the dermatophyte infection and clinical signs resolved spontaneously over six months. Additionally, an adult 6-yr-old male panther from southern Florida USA that presented initially with alopecia of the head, ears and neck to include the rear limbs and abdominal region with excoriations, ulcerations, and multifocal pyoderma that later progressed to lichenification of the skin and loss of nails from two digits. When topical therapy applied in the field at 45 day intervals was ineffective in clearing the infection, the animal was placed in captivity for intensive oral therapy to prevent further dermal mycosis, loss of additional nails and spread of infection to other panthers. The panther was treated with itraconazole at 9.5 mg/kg placed in the food once daily for six weeks. After treatment, nail regrowth occurred but the multifocal areas of alopecia remained. The panther was released back into the wild after two skin biopsy cultures were negative. Temporary removal of an endangered free-ranging species from its habitat for systemic treatment of dermatophytosis requires consideration of several factors including age, reproductive potential, holding facilities, treatment regimen and the potential for successful reintroduction of the animal.

Key words: Florida panther, dermatophyte, itraconazole, wildlife

INTRODUCTION

Dermatophyte infections are the result of fungal growth on cornified or dead tissues such as the keratin of the skin or nails. Dermatophytes are classified on the basis of morphologic characteristics as well as mode of transmission. The three most common genera affecting mammals are Microsporum, Epidermophyton, and Trichophyton,⁸ which may be geophilic, anthropophilic, or zoophilic.

Reported cases of fungal infection in free-ranging mammals due to Microsporum spp. and Trichophyton spp. are rare. T. mentagrophytes has been reported in red foxes (Vulpes vulpes),⁴ opossums (Didelphis virginiana), and various feral rodents.⁶ Infected carriers exhibit no clinical signs but are able to spread fungi to other animals via direct or airborne spores³ as has been reported from a spread of T. verrucosum from mule deer (Odocoileus hemionus) to domestic cattle.⁹

Among domestic felids in North America, M. canis is the most common etiologic agent reported.⁸ Dermatophyte infections in 440 domestic feline samples submitted from Florida were caused by M. canis (83.3%), M. gypseum (3.4%), T. mentagrophytes (2.1%), T. verrucosum (5.9%) and T. tonsurans (0.4%). Three cases of dermatophyte infection occurred in Florida panthers (Felis concolor coryi) from 1994 to 1996 from southern Florida, USA (26°-14'2"N, 81°-15' 30"W). One panther had had M. gypseum, and two were diagnosed with T. mentagrophytes. These three cases represent a prevalence rate of 5% based on a population of 30-50 radio collared adults. This report discusses the spontaneous recovery of the two subadult panthers and documents the two-year course of the T. mentagrophytes infection in an adult panther.

CASE REPORTS

Case 1

A 7-month old male panther kitten was immobilized for routine radio-collaring, physical examination, and sample collection. Focal alopecia with erythematous borders on the distal third of the tail was observed. No follicular mites were found in skin scrapings at the periphery of the lesions. Fungal culture on dermatophyte test medium (DMS Laboratories, Fleming, New Jersey 98822, USA) grew M. gypseum. Other than the tail lesions, the panther was in good physical condition, and therapy was not initiated. This animal was rechecked at a

subsequent immobilization three months later and had no evidence of infection.

Case 2

A 6-month old male panther kitten was immobilized for routine radio-collaring, physical examination and sample collection. Multifocal alopecia was observed and cultures of hair removed from the periphery of the lesions grew T. mentagrophytes. The mother of this panther was examined and did not have observable lesions. The panther was not treated for the dermatophyte infection, and at an immobilization six months later for refitting of the radio collar, the alopecia was resolved.

Case 3

A 6-year old free-ranging male panther had areas of moderate alopecia covering portions of the head, ears, and rear limbs at the time of his biennial recollaring and physical exam in 1995. While immobilized, the panther was treated with ivermectin (MSD-Agvet, Rahway, New Jersey 07065, USA) at 0.2mg/kg SQ, for suspected notoedetric (Notoedres cati) mange which has been reported in Florida panthers.⁵ The panther was treated twice more with ivermectin at the same dosage at 4-6 week intervals for three treatments, but no improvement in the alopecia was noted during several visual re-examinations over a period of eight months. The panther was immobilized for sample collection and examination. The alopecia had extended to include 85% of its body. Excoriations, ulcerations, multifocal pyoderma, and lichenification of the skin were present. Crusting of both pinnae, , onychomadesis of the right front second digit and right rear third digit, abnormal nail shape of most digits, and swelling of the right rear digital pad was observed. General body condition and weight were normal. Diagnostic tests included a complete blood count (CBC), chemistry panel, skin scrapes for examination for mites and for fungal elements using KOH, fungal cultures of skin and fur and a fine needle aspirate of the swollen right rear digital pad.

Hematology and serum chemistries were normal except for an elevated globulin fraction (8.6mg/dl, range 6.4-8.2 mg/dl).² The KOH treated skin scrape revealed numerous hyphae. The fine needle aspirate of the swollen digital pad revealed squamous metaplasia possibly in response to the fungus. The aspirate material was also cultured with no fungal growth occurring. The skin biopsy revealed folliculitis, pyoderma with many

intralesional fungal spores, and hyphae. The skin scrape culture grew only contaminant fungi (Rhizomucor sp. and Fusarium sp.). Hair culture grew contaminant species and T. mentagrophytes.

While immobilized, the panther was bathed in dilute povidone iodine solution (Purdue Frederick Company, Norwalk, Connecticut 06580, USA) and then dipped with lime sulfur (DVM Products, Miami, Florida 33172, USA) at 8oz/gallon of water. Clotrimazole lotion (Haver/Diamond, Shawnee, Kansas 66201, USA) was applied to all areas of the body with special attention to the digits. Both treatments were repeated 45 days later. No improvement was observed after these treatments. Due to difficulty in treating this panther under field conditions, it was placed into captivity at the Wildlife Research Laboratory, Gainesville, Florida, USA for systemic therapy.

The CBC, chemistry panel and parasite screen were repeated. The panther was positive for Cytauxzoon felis, but feline leukemia virus antigen and feline immunodeficiency virus antibody were negative. Alaria and Spirometra mansonoides were seen on a direct fecal smear. Itraconazole (Janssen Pharmaceuticals, Titusville, New Jersey 08560, USA) was placed in food once daily at a dosage of 9.5 mg/kg for a six week period. Treatment started one month after capture. After the second and sixth skin week of therapy, skin scraping and cultures of hair and nails was done. All cultures were negative for fungal growth. Skin biopsies at this time showed an absence of fungal hyphae and diffuse dermal fibrosis and follicular atrophy.

The panther was released within its former territory six weeks after cessation of treatment. Visual examinations were conducted at three and eight months after therapy. The panther was in good body condition but had no visible regrowth of hair. No lacerations or skin abrasions were noted. The panther was able to climb without noticeable difficulty.

At twelve months after therapy cessation, the panther was visually reexamined and a fleshy, tan circumscribed mass was observed on the right rear at the area of the wing of ilium. The panther was immobilized and transported to the Lowry Park Zoo, Tampa, Florida, USA for mass removal. The condition of the skin remained unchanged. Skin punch biopsies were cultured along with pieces of the mass. The cultures grew contaminant fungi only. The mass was composed of granulation tissue and multifocal suppurative foci.

The panther was released into its habitat two weeks later.

DISCUSSION

Dermatophyte infections are usually seen in younger animals, older animals or animals with systemic/immune suppressive diseases.⁸ This panther may have developed severe dermatophyte infection resulting from exposure to a highly pathogenic strain of fungus, immune system compromise or suppression or an increased length of time of exposure to the fungus. The source of exposure in this case may have been a prey item or another panther during mating or intraspecies aggression.

Panthers of all age ranges risk exposure to dermatophytes. Kittens are nurtured in areas of dense understory and moist soil where exposure to geophilic species and zoophilic species may occur. Development of dermatophytosis could also occur in sub-adult and adult panthers from prey or other panthers. Many of these infections may go unnoticed clinically as panthers are handled biennially. The 5% prevalence rate may be less than the actual rate of occurrence because these animals are only handled every other year and infections could occur and spontaneously resolve without being detected. Furthermore, subclinical cases may be present. A more precise determination of prevalence rate may be possible by culturing hair and skin from all immobilized animals during the biennially recollarings to determine clinical and subclinical cases.

Dermatophyte infections typically occur in younger animals because they have a decreased resistance to fungal invasion,⁸ whereas adult animals tend to be more resistant to infection because of changes in the skin, skin secretions, hair replacement cycle and development of an immune response to dermatophytes.⁸ Immune compromised animals or animals on immune depressing drugs are more susceptible to infection. The adult panther described may have an underlying immune system dysfunction. However, assertions of an immune compromised state remain speculative until tests of immune function such as flow cytometry and in vitro mitogen lymphocyte stimulation are conducted. This is an area of future research. cytometry) and function have not been done at this time.

The decision to treat dermatophyte-infected panthers either topically in the field or systemically in a

captive environment requires consideration of several factors. These include the severity of infection, age of the animal, reproductive potential, capability of the holding facility, treatment regimen, and the potential for the animal to re-establish its territory. Upon first detection of dermatophytosis, observation should be made over the next four to six months to determine if the condition is resolved or if other treatment options should be considered. Although unsuccessful in the panther in this report, topical therapy in the field may be warranted in less advanced cases.

Systemic therapy is limited to griseofulvin and to the triazoles, itraconazole, fluconazole and ketoconazole. All of these drugs are labeled for usage against dermatophytes.* However, griseofulvin is the only FDA approved antifungal for cats. There has not been extensive study of the triazoles in cats except for the study by Moriello and DeBoer that compared the efficacy of griseofulvin and itraconazole.* In cats these drugs were found to be equal in efficacy after a 35 day treatment period. Itraconazole treated cats though, healed more quickly and had fewer satellite lesions.

In human studies, itraconazole was found to attain higher plasma levels, to have a higher margin of safety, and to remain in epidermal tissue including the nail bed for several weeks after therapy.* This has led to its usage in human tinea pedis.* These attributes made itraconazole a good choice for therapy for the panther. Since panthers may not eat every day that they are in captivity, a drug that could potentially attain high tissue and plasma levels could bridge the days when medication was not ingested. Furthermore, drug levels that remain high in keratinized tissue weeks after therapy cessation would be essential in a free-ranging animal that would be difficult to conduct follow-up on under field conditions.

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