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Mycosis: An Emerging problem of captivity in Zoo Animals

Manoj kumar Sinha, Manju Sinha

Assistant Professor, Department of Veterinary Anatomy, Bihar veterinary college, Patna
Assistant Research Officer, Division of Virology, Institute of Animal Health & Production, Bihar,
Patna

Introduction

Like domestic animals, wild animals are susceptible to various fungal infections. Fungi are a relevant cause of diseases in wild animals. Fungi are heterophilic microorganism and are ubiquitous in nature and remain in the environment throughout the year and increase quantitatively in hot and humid months. Now it has been realized that the mycoses are diseases of common occurrence that they present difficult diagnostic and therapeutic problem. Valuable wild animals that are susceptible to mycoses are monkeys, tigers, lions and alligators. The captivity of wild animals are given limited space and are continuously fed on high energy food which generate lot of metabolic heat and are given shots of different vaccines, broad spectrum antibiotics and corticosteroids to protect the health. All of these cause stress to animals predisposing them to established fungal pathogens. Other factors like hand rearing, malnutrition, change of diet, shipping stress and infestation with different parasites which contribute to the development of fungal infection. They cause mycosis, and allergic disease involving the development of hypersensitivity or mycotoxicosis.

Classification of mycoses on the basis of anatomical structure:

1. Superficial mycosis: in this mycosis outermost skin and hair is involved. The disease caused by superficial fungi are- piedra, black piedra, and white piedra.
 - Piedra: Caused by fungus and mainly affect to hair and characterized by the development of nodules along the involved hair shaft.



- Black Piedra: Caused by *Piedra hortai*. It is reported in chimpanzee, primates, crab eating macaque, white handed Gibbons and large Langur.
 - White Piedra: caused by *Trichosporon cutaneum*, *T. equinum*. It is reported in German horses and spider monkey.
2. Cutaneous mycosis: in this mycosis fungi are invading skin and hairs in comparison to superficial mycosis. The diseases in this group include dermatophytosis and cutaneous candidiasis.
- Dermatophytosis: Dermatophytosis caused by *Trichophyton*, *Microsporium*, *Epidermophyton* and *keratinomyces*. It is reported in dermatophytosis in zoo rabbit caused by *Microsporium gypseum*, and *Trichophyton simmi*. *Trichophyton gallinae* is the prime cause of ringworm or fowl favus in birds and it has been isolated from several species of wild birds. *Microsporium audouinii* isolated from a chimpanzee (*Pan troglodytes*), and *Microsporium canis* are isolated from a maned wolf (*Chrysocyon brachyurus*). This mycotic disease, also known as ringworm, is a very contagious and infectious skin disease. Dermatophytosis may appear as one or as a combination of hair loss, papules, scales, crusts, erythema, hyperpigmentation, and pruritus. It causes economic losses as well as great public health importance as human beings may contact disease from affected animals.
 - Cutaneous candidiasis: *Candida albicans* may produce infection of nail, skin and mucous membrane (Thrus and Vaginitis).
3. Subcutaneous mycosis: Fungi responsible for subcutaneous mycosis involve both skin and subcutaneous tissues.
- Rhinosporidiosis: caused by *Rhinosporidium seeberi*. The crocodile's rhinoceros habitual of residing in stagnant water may be infeted by the spores if the water is contaminated. It can be diagnosed by clinical examination or demonstration of spores in the tissue only because this fungus cannot grow in artificial media.
 - Spirotrichosis: it is caused by *Sporotrichum schenckii*, a dimorphic fungus ant it is confined to the extremities and the lesions are pyogenic ulcers at the site of infection with the involvement of the lymphatic draining. Crustaceous skin alterations and alopecia were observed in an Eastern quoll (*Dasyurus viverrinus*) with *S. humicola* infection



- Chromomycosis: it is caused by Actinomycotic and Maduromycotic fungi and symptom is characterized by swelling, formation of sinuses and presence of granules in the pus.
- 4. Systemic Mycosis: Systemic mycosis is caused by several unrelated fungi which invade and attack deeper tissues of the body and are dangerous and as widespread as superficial mycosis.
- Candidiasis: many species of *Candida* cause the disease in animal man and wild animals. Most common species are *Candida albicans*. After antibiotic therapy several monkey developed mycosis of the oral cavity (Thrus) caused by *Candida albicans*. The disease caused by *Candida albicans* are also reported in Gorilla and polar bear.
- Cryptococcosis: It is caused by true capsulated yeast known as *Cryptococcus neoformans*. In India organism has been isolated from pigeon droppings. It is considered as Pigeon droppings is an important source of infection in zoo animals.
- Aspergillosis: Animals especially kept in captivity are more prone to aspergillus infection. Aspergillus species are ubiquitous in nature and are prolific spore producers. Aspergillosis has reported in living duck and birds. In India *A. fumigates* reported in sparrow and lung in Brahmin duck.

Conclusion

Wild animals are an important component of the ecosystem, and play a major role in it. Now a days wildlife has been a major source of infectious diseases transmissible to humans. Wildlife acts as a reservoir, which is a major public health problem. In conclusion, mycoses of wildlife are of public health importance; therefore, veterinarians, human medics, public health specialists, zookeepers, and wild pet owners should be better informed about the etiology, epidemiology, diagnosis, and pathology of mycotic diseases of wildlife under one health concept.

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