



CASE REPORT

Dermatitis Caused by *Dermatophilus congolensis* in a Zoo Polar Bear (*Ursus maritimus*)

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ABSTRACT

Dermatophilosis caused by *Dermatophilus congolensis* has a wide host range, including cattle, horses, camels, and bears. The present case was characterized by severe exudative dermatitis with thick scab formation on the face and whole body of a polar bear in Seoul Zoo, Korea. For diagnosis, fresh crusts from the face were minced with several drops of normal saline, smeared on a glass slide, stained with Diff-Quick[®] and examined microscopically. *Dermatophilus congolensis* organisms were observed as several parallel rows of gram-positive cocci resembling railroad tracks. Recovery was dramatic with intramuscular procaine penicillin therapy. Bathing in warm, salty water was effective to soften the skin lesions and remove the debris.

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INTRODUCTION

Dermatophilus congolensis infection occurs in many species of livestock and wild animals, including horses (Byrne *et al.*, 2010), greater flamingos (Gobeli *et al.*, 2013), foxes (Zaria, 1993), and humans (Amor *et al.*, 2011). The organism frequently causes benign infections in the epidermis, with little effect on the general health of the host. Occasionally, however, it causes a severe dermatitis that may lead to death (García *et al.*, 2013). Dermatitis caused by *Dermatophilus* infection has been reported in humans (Burd *et al.*, 2007), deer (Nemeth *et al.*, 2013), camels (Khodakaram-Tafti *et al.*, 2012) and raccoons (Zaria, 1993). The present report describes a *Dermatophilus* infection causing severe dermatitis in a polar bear that achieved complete recovery. To the authors' knowledge, no previous research on dermatophilosis in wild and zoo animals in Korea has been performed. Therefore, this case study was undertaken to provide information regarding the risk of dermatitis caused by *D. congolensis* in wild and zoo animals in Korea.

Case description: A female polar bear weighing 230 kg developed progressive dermatitis with marked encrustation of the skin. The affected skin was examined closely and palpated under anesthesia. The bear was fasted and water was withheld for 18 h prior to anesthesia. Anesthesia was successfully achieved using the

combination of tiletamine hydrochloride + zolazepam hydrochloride (Zoletil[®], 2.2 mg/kg intramuscularly; Virbac S.A., Carros, France) and medetomidine (0.06 mg/kg intramuscularly; Orion Pharma Animal Health, Espoo, Finland) (Fahlman *et al.*, 2011). Anesthesia was reversed with atipamezole (0.24 mg/kg intramuscularly) after all procedures had been completed. The lesions were characterized by matted hair, thickening of the skin, and crust formation. The affected areas were distributed over the face, ears, around the neck, and over the dorsal and lateral surfaces of the body. The affected skin was hard and rough on palpation because of the presence of broad, hyperkeratinized skin lesions. The lesions were irritating, causing the bear to often rub and scratch against the wall. The coat color had changed from white to yellowish-brown (Fig. 1). The bear was obviously reluctant to swim while it was affected.

Samples of the thick scabs and crusts of the face, neck, and forelimbs were examined. The samples were minced with normal saline, smeared on a glass slide, air-dried, and stained with Diff-Quick[®]. Several parallel rows of gram-positive cocci resembling railroad tracks were observed under microscopic inspection (oil immersion, ×100) (Fig. 2). These cocci were characteristic of *D. congolensis* and were present in most of the skin sections. The pretreatment hematology and serum chemistry levels were within the reference ranges (Table 1 and 2). We made a probable diagnosis of dermatophilosis caused by *D. congolensis*.



Fig. 1: The lesions were distributed over the face, ears, neck, and whole body. The skin lesions showed hyperkeratosis. Thick scabs were sampled from the face and neck.

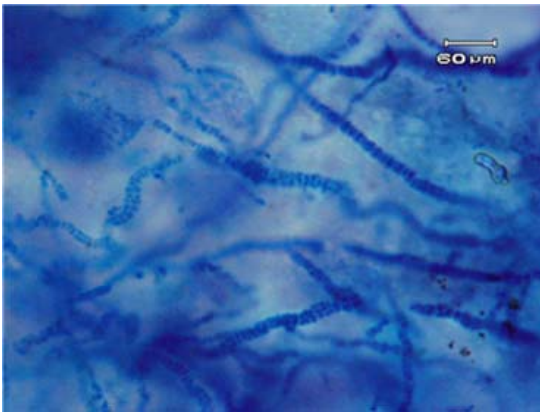


Fig. 2: Under microscopic inspection ($\times 100$), parallel rows of gram-positive cocci resembling railroad tracks were observed after Diff-Quick[®] staining.

The bear was thoroughly soaked in warm, salty water (35 ppt, ‰) containing dissolved natural black salt produced in Mt. Himalaya to soften the scabs and crusts of the skin lesions. After cleansing the whole body with KetoChlor[®], a skin care shampoo (Virbac AH Inc, Fort Worth, TX), the debris of the affected lesions was gently removed. The skin lesions improved dramatically after treatment with one high dose of 22,000 IU/kg penicillin G procaine (Cheil Bio Co., Ansan, Korea) administered intramuscularly. The bear was confined to its pen during treatment to reduce the risk of spread and cross-infection by constant wetting. Clinical improvement was indicated by the loss of scabs, a return to the typical milky white hair color, and a return to swimming in the pool.

DISCUSSION

Dermatophilosis is an acute or chronic infection of the epidermis resulting from exudative dermatitis with scab formation caused by *D. congolensis* (Khodakaram-Tafti *et al.*, 2012). The disease can affect many species of domestic and wild animals, and occasionally affects humans (Zaria, 1993; Amor *et al.*, 2011). The clinical

Table 1: Hematology test results of a polar bear infected with *Dermatophilus congolensis*.

Parameter	Result	Reference values (ISIS)
White blood cells ($\times 10^3/\mu\text{L}$)	10.86	9.52 \pm 3.08
Red blood cells ($\times 1000^6/\mu\text{L}$)	6.00	6.79 \pm 1.07
Hemoglobin (g/dL)	13.3	15.5 \pm 2.0
Hematocrit (%)	34.3	44.1 \pm 5.4
Mean corpuscular volume (fl)	57.1	65.7 \pm 7.0
Mean corpuscular hemoglobin (pg)	22.2	23.1 \pm 1.9
Mean corpuscular hemoglobin concentration (g/dL)	38.8	35.0 \pm 1.7
Platelets ($\times 10^3/\mu\text{L}$)	614	441 \pm 156

Table 2: Serum biochemistry test results of a polar bear infected with *Dermatophilus congolensis*.

Parameter	Result	Reference values (ISIS)
Total protein (g/dL)	8.9	8.0 \pm 1.0
Albumin (g/dL)	2.9	4.0 \pm 0.5
Direct bilirubin (mg/dL)	0.1	0.0 \pm 0.1
Total bilirubin (mg/dL)	0.3	0.2 \pm 0.2
Gamma-glutamyl transpeptidase (U/L)	71	132 \pm 182
Glutamic oxaloacetic transaminase (U/L)	72	80 \pm 34
Glutamic pyruvic transaminase (U/L)	15	40 \pm 34
Alkaline phosphatase (U/L)	231	66 \pm 94
Lactic dehydrogenase (U/L)	290	707 \pm 474
Creatine phosphokinase (U/L)	73	180 \pm 219
Triglycerides (mg/dL)	152	199 \pm 101
Total cholesterol (mg/dL)	242	289 \pm 54
Glucose (mg/dL)	242	119 \pm 37
Uric acid (mg/dL)	0.8	1.0 \pm 0.3
Creatinine (mg/dL)	0.8	1.2 \pm 0.4
Blood urea nitrogen (mg/dL)	40.8	20 \pm 9
Inorganic phosphorus (mg/dL)	6.0	6.2 \pm 1.4
Calcium (mg/dL)	7.7	9.3 \pm 0.7

signs of dermatophilosis are hair matted together into paintbrush lesions, crust or scab formation as the initial lesions coalesce and accumulation of cutaneous keratinized material forming wart-like lesions (Khodakaram-Tafti *et al.*, 2012). The clinical findings in the present case were progressive dermatitis with alopecia on the muzzle, thickening of the skin, and crust formation due to hyperkeratinized skin. The affected areas were generalized over the face, ears, neck, and whole body. The lesions caused itchiness so that the bear often rubbed and scratched at the skin. The coat color changed from white to yellowish-brown due to serum exudates with diffuse exudation. These findings are similar to those reported in wild mammals (Zaria, 1993; Khodakaram-Tafti *et al.*, 2012).

The diagnosis depends largely on the appearance of lesions in clinically affected animals and the demonstration of *D. congolensis* in stained smears from scabs (Byrne *et al.*, 2010). Diff-Quick[®]-stained smears from thick scabs and crusts of the face, body, and forelimbs in the present case revealed the characteristic *D. congolensis* organisms arranged in several parallel rows of gram-positive cocci that resembled railroad tracks. Byrne *et al.* (2010) described a case in which a complete blood count and serum biochemical panel was within normal limits in a *D. congolensis*-infected pony. In the present case, the pretreatment hematology and serum chemistry levels were also within the reference ranges.

For treatment, the bear was thoroughly soaked in warm, salty water (35 ppt, ‰) containing dissolved natural black salt to soften the scabs and crusts. Antibacterial shampoo was applied to the whole body to

prevent secondary infection. The animal was treated with penicillin. The skin lesions were rapidly cured after treatment with one high dose of penicillin G procaine. This is believed to be the first case report of dermatophilosis in a wild or zoo animal in Korea and suggests the necessity for investigation of effective prophylaxis against this organism.

REFERENCES

- Amor A, A Enríquez, MT Corcuera, C Toro, D Herrero and M Baquero, 2011. Is infection by *Dermatophilus congolensis* underdiagnosed? *J Clin Microbiol*, 49: 449-451.
- Burd EM, LA Juzych, JT Rudrik and F Habib, 2007. Pustular dermatitis caused by *Dermatophilus congolensis*. *J Clin Microbiol*, 45: 1655-1658.
- Byrne BA, CL Rand, VR McElliott, EM Samitz and SA Brault, 2010. Atypical *Dermatophilus congolensis* infection in a three-year-old pony. *J Vet Diagn Invest*, 22: 141-143.
- Fahlman A, JM Arnemo, JE Swenson, J Pringle, S Brunberg and G Nyman, 2011. Physiologic evaluation of capture and anesthesia with medetomidine-zolazepam-tiletamine in brown bears (*Ursus arctos*). *J Zoo Wildl Med*, 42: 1-11.
- García A, R Martínez, JM Benitez-Medina, D Risco, WL Garcia, J Rey, JM Alonso and JH de Mendoza, 2013. Development of a real-time SYBR Green PCR assay for the rapid detection of *Dermatophilus congolensis*. *J Vet Sci*, 14: 491-494.
- Gobeli S, A Thomann, F Wyss, K Kuehni-Boghenbor, I Brodard and V Perreten, 2013. *Arsenicococcus dermatophilus* sp. nov, a hypha-forming bacterium isolated from the skin of greater flamingos (*Phoenicopterus roseus*) with pododermatitis. *Inter J Syst Evol Microbiol*, 63: 4046-4051.
- Khodakaram-Tafti A, M Khordadmehr and M Ardiyan, 2012. Prevalence and pathology of dermatophilosis in camels (*Camelus dromedaries*) in Iran. *Trop Anim Health Prod*, 44: 145-148.
- Nemeth NM, MG Ruder, RW Gerhold, JD Brown, BA Munk, PT Oesterle, SV Kubiski and MK Keel, 2013. *Demodectic Mange*, dermatophilosis, and other parasitic and bacterial dermatologic diseases in free-ranging White-tailed deer (*Odocoileus virginianus*) in the United States from 1975 to 2012. *Vet Pathol*, [Epub ahead of print].
- Zaria LT, 1993. *Dermatophilus congolensis* infection (Dermatophilosis) in animals and man. An update. *Comp Immunol Microbiol Infect Dis*, 16: 179-222.