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MANAGEMENT OF A BLACK LEOPARD (*PANTHERA PARDUS*) WITH SEASONAL ATOPY AND CUTANEOUS ADVERSE FOOD REACTION BY USING TRANSMUCOSAL IMMUNOTHERAPY

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Abstract: An 11-yr-old female black leopard (*Panthera pardus*) was presented with pruritus and intermittent gastrointestinal distress for a duration of 18 mo. Dietary elimination trial and challenge confirmed food hypersensitivity. Milder and persistent pruritus, while consuming a strict elimination diet, confirmed atopic dermatitis also was related to airborne environmental triggers identified by intradermal allergy testing. Ultimately, atopy was controlled successfully by antihistamines and transmucosal immunotherapy for 7 yr after diagnosis.

Key words: Allergy testing, atopy, black leopard, food sensitivity, *Panthera pardus*, transmucosal immunotherapy.

BRIEF COMMUNICATION

An 11-yr-old female black leopard (*Panthera pardus*) presented with signs of pruritus manifested as excessive rubbing and overgrooming behaviors directed to the face, neck, and front paws. It had been living in the same indoor environment for 5 yr, and no new enclosure items or cleaning agents had been introduced recently. For 5 mo, ongoing severe pruritus resulted in secondary alopecia and mild skin abrasions in the described areas. These signs resolved after a subsequent 5-mo course of nonspecific nutraceutical, steroid, and antihistamine treatments. However, they reappeared the following year during the same season and progressed until the leopard was sedated for an examination and dermatologic consultation at 5 mo after the second presentation. Clinical signs appeared consistent with both atopy and cutaneous adverse food reaction.^{1,2}

The leopard was sedated with tiletamine-zolazepam (Telazol, Fort Dodge Animal Health, Fort Dodge, Iowa 50501, USA; 100 mg i.m.) and ketamine (Ketathesia, Butler Animal Health Supply, Dublin, Ohio 43017, USA; 50 mg i.m.), then maintained with isoflurane (Vet One, Meridian, Idaho 83680, USA) in oxygen via an endotracheal tube. The leopard demonstrated substantial traumatic alopecia with lichenification; excoriations;

and secondary hyperpigmentation on the pinnae, face, and ventral neck; and a mild papular dermatitis on the ventral abdomen. In-house evaluation of superficial and deep skin scrapes performed for cytology revealed degenerative neutrophils and few eosinophils. Skin scrapes in oil revealed trauma of the hair shaft apex, which was suggestive of self-trauma, but, otherwise, the hair shafts were normal, and no ectoparasites were seen. Complete blood cell count and blood chemistry panel were within normal limits for the species. No evidence of eosinophilia was identified on hematology at this examination or historically. Hair plucks incubated on dermatophyte test medium remained negative after 4 wk of incubation. Punch skin biopsies were collected at the ventral inguinal area, right cheek, and left lateral neck, and submitted for histopathology (ZooPath Program, Urbana, Illinois 61802, USA). These samples demonstrated a moderate superficial perivascular nonsuppurative process that was consistent with a diagnosis of allergic or hypersensitivity dermatitis.⁵ Intradermal allergy testing was performed on the left lateral thorax by using a panel of allergens, which resulted in several strong positive skin reactions, including cockroach, couch and/or quack grass, dust mites, flea, house fly, mosquito, and sheep epithelium (Fig. 1).

An antiparasitic agent (Ivermectin, Noromectin, Norbrook Laboratories Ltd., Newry, County Down BT35 6JP, United Kingdom; 9.23 mg p.o. once weekly for six weeks) and flea control regimen (Frontline Plus, Merial Ltd., Duluth, Georgia 30096, USA; 2.68 ml topically once monthly for six months; and Lufenuron Program,

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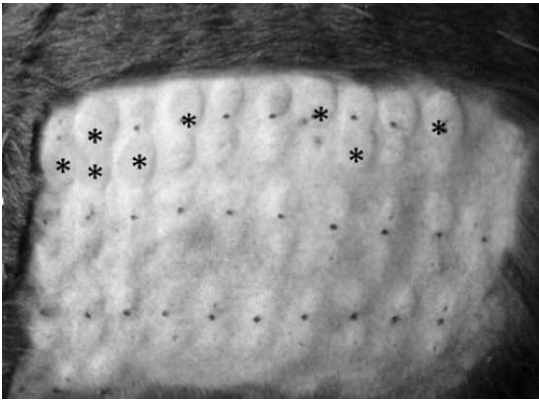


Figure 1. Shaved skin of left lateral thorax of black leopard, demonstrating reactions to intradermal allergy testing. * = Strong positive (3+ to 4) reactions on 0–4 scale include histamine (positive control), sheep epithelium (wool), *Dermatophagoides farinae* (dust mite), mosquito, house fly, cockroach, flea, and couch and/or quack grass.

Novartis Animal Health, CH-4002 Basel, Switzerland; 29.6 mg/kg p.o. once monthly for six months) were instituted immediately after this examination as a trial treatment to eliminate possible hypersensitivity to unseen ectoparasites. Additional treatment of omega-3 essential fatty acid supplementation (EFA-caps, Virbac Animal Health, Fort Worth, Texas 76137, USA; 4 capsules p.o. s.i.d.; and Skin Formula 3V Caps Liquid, DVM Pharmaceuticals, Inc., Miami, Florida 33137, USA; 3 ml p.o. s.i.d.) proved unsuccessful in reducing clinical signs over 30 wk of administration. Amitriptyline (Qualitest Pharmaceuticals, Huntsville, Alabama 35811, USA; 0.14 mg/kg p.o. s.i.d.) administered concurrently for 8 wk with this treatment was unsuccessful in disrupting any behavioral component to the overgrooming and pruritus. Topical medications, including benzocaine (Foilie First Aid Spray, Blistex, Oak Brook, Illinois 60523, USA; topically b.i.d.) and hydrocortisone (ResiCORT, Virbac Animal Health, Fort Worth, Texas 76137, USA; topically 3 times weekly), were unhelpful in reducing self-directed trauma. The immediate environment of this leopard was controlled to the extent possible by use of less allergenic housing materials, such as cardboard offered as bedding and enrichment rather than hay or cloth. Plants were excluded from the enclosure. However, because the indoor enclosure of this leopard was exposed to the outdoors via unfiltered building ventilation with external access, airborne

allergens could not be avoided, nor could indoor allergens, such as house dust mites.

A diet trial, the most important tool in the diagnosis of a cutaneous adverse food reaction,⁶ was initiated after this annual examination. A prescription nonallergenic limited-ingredient diet was used, which contained novel protein (venison, rabbit, duck) sources (Royal Canin Hypoallergenic Selected Protein Adult, St. Charles, Missouri 63301, USA). Over a 3-mo period, the leopard was transitioned from a beef-based commercial diet (Natural Balance, Dick Van Patten's Natural Balance Pet Foods, Inc., Pacoima, California 91331, USA; and Milliken Meat Products, Ltd., Markham, Ontario L3R 0B4, Canada). Delayed transition occurred due to intermittent gastrointestinal signs, including diarrhea and vomiting, which prompted use of both canned and kibbled allergen-elimination diet formulations. Ten weeks after full transition to the elimination diet was completed, substantial reduction of trauma secondary to pruritus was noted on the pinnae and face. Hair returned to these areas, and the skin lesions resolved. Observed episodes of rubbing were less frequent and less destructive in the target areas. After the complete cessation of clinical signs 14 wk after full transition to the elimination diet, foreign food items from a zoo patron, including beef jerky and goldfish crackers (Pepperidge Farm, Norwalk, Connecticut 06851, USA), were discovered in the leopard's enclosure on two separate occasions, at 11 and 21 mo, respectively, after complete transition to the elimination diet. In both instances, the result was an allergic flare within 24 hr of consumption of the novel food items and involved marked pruritus and extensive secondary traumatic alopecia and hyperemia on the face, ventral neck, and base of the pinnae. Remission of clinical signs followed the induced flare after 3–4 wk of strict elimination diet. The leopard was continued on this elimination diet indefinitely due to markedly improved skin condition. A definitive diagnosis of adverse food reaction had been made, confirmed by the return of clinical signs after ingestion of the provoking food items and the subsequent remission of signs on the elimination diet.^{2–4}

Two years after the initial dermatologic consultation, antihistamine therapy was pursued concurrently with the elimination diet to manage periodic episodes of increased pruritus, which occurred most frequently during spring. Chlorpheniramine maleate (SDA Laboratories, Greenwich, Connecticut 06830, USA; 4 mg p.o. b.i.d.), proved unsuccessful in reducing pruritus and had

undesirable sedative effects at this dose. Upon the dermatologist's recommendation, diphenhydramine hydrochloride (Qualitest Pharmaceuticals, Huntsville, Alabama 35811, USA; 25 mg p.o. s.i.d.) was initiated at an extremely conservative dose 3 mo after discontinuation of chlorpheniramine.

Over the next 2 yr, clinical signs were markedly controlled compared with the initial presentation, although seasonal flares were still present. During this time, the diphenhydramine dose was increased gradually to maintain adequate control of allergic flares because the animal developed apparent tolerance to the drug. At the maximum dose (75 mg p.o. b.i.d.), continuation of the prescribed antihistamine regimen was insufficient to prevent all seasonal flares. Repeated annual examinations included histopathology of facial skin biopsies, which remained consistent with a diagnosis of allergic dermatitis, although with reduced severity from the pretreatment assessment.

Transmucosal immunotherapy based on the initial intradermal testing results thus was initiated and pursued in addition to the antihistamine regimen and elimination diet. It was elected to use the prior intradermal testing results as a guide for this treatment regimen, so the hyposensitization solution (GREER, Lenoir, North Carolina 28645, USA) consisted of 10% each of the antigens of mixed feathers, sheep epithelium, house dust mix, house mite, couch and/or quack grass, nettle, black and/or carpenter ants, mosquitoes, house fly, and cockroach antigen. Local, organic, unfiltered honey (1.0 ml) was used as a vehicle and the honey-allergen mixture was administered in the canned diet. Hyposensitization was given every 48 hr at increasing amounts of antigen, until the dose reached 1.0 ml of vaccine at a concentration of 20,000 PNU/ml. This dose was repeated every 2 wk until an examination 10 mo later. At this time, it was noted that atopy control was much improved over the previous year, although very mild alopecic areas on the right lateral aspect of the face, right pinna, ventral neck, and dorsal scapula were still observed. Due to increased

pruritus subsequent to administration of the antigens for several doses, the hyposensitization dose was decreased to 0.8 ml of vaccine at a concentration of 20,000 PNU/ml, which was repeated every 2 wk indefinitely.

Within 3 mo of this last change, this animal's atopic status was markedly improved, with no signs of pruritus, lesions, alopecia, or erythema. Skin and pelage were healthy, aside from exhibiting normal age-related graying. Only occasional mild seasonal atopic flares occurred. No further changes to the treatment regimen were recommended by dermatologic consultation. Successful atopy control was maintained for 7 yr until the leopard's death from geriatric renal failure at age 20 yr.

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