

Retrospective Study of Disease Occurrence in Captive African Pygmy Hedgehogs (*Atelerix albiventris*)

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ABSTRACT

African Pygmy hedgehogs (*Atelerix albiventris*) are commonly kept in zoological collections and as pets. The aim of this study was to present disease occurrence in captive African Pygmy hedgehogs. Medical records of 106 male and female African Pygmy hedgehogs, both privately owned and from zoological collections, presented to a veterinary teaching hospital from 1994 to 2013 were reviewed. The most common diseases found in captive African Pygmy hedgehogs in this study were dermatological diseases (66.04%), gastrointestinal diseases (33.02%), and skeletal diseases (15.09%). Other identified disorders included neurologic disease, obesity, and renal disease. This is the first retrospective study to describe occurrence of diseases observed in captive African Pygmy hedgehogs. The most common clinical finding in captive hedgehogs was dermatological disease, specifically acariasis. Based on this study, it is recommended that all captive hedgehogs be examined regularly for timely diagnosis and treatment of common diseases of this species.

Keywords: Captive African Pygmy Hedgehogs; *Atelerix albiventris*; Common Diseases; Dermatology; Gastroenterology; Orthopedics.

INTRODUCTION

The African Pygmy hedgehog (*Atelerix albiventris*) is a member of the family Erinaceidae, order Insectivora (1). African hedgehogs are native to the savannah and steppe regions of central and eastern Africa (1). In the wild, African hedgehogs are nocturnal and spend the daytime in burrows (1). They are insectivores and their diet consists mainly of invertebrate predators such as earthworms, slugs, and snails (1, 2). Wild African hedgehogs reach sexual maturity at 1 year of age; however, there are reports of hedgehogs reproductively active prior to this age, particularly in captivity (3). Hedgehogs are popular as pets and are also common in zoological collections (1, 4).

Due to the popularity of this captive species, several retrospective studies have been previously reported in hedgehogs

but focused mainly on neoplasia. Other diseases have only been briefly or anecdotally described in the literature (1, 4-7).

The goal of this review is to present disease occurrence in captive African Pygmy hedgehogs presented to the veterinary teaching hospital at the Kansas State University.

MATERIALS AND METHODS

Animals

Medical records of privately owned and zoologically kept captive African Pygmy hedgehogs were reviewed. These animals were presented for varying signs of disease or regular health checks and were examined by the Exotics and Zoological Medicine Service, College of Veterinary Medicine, Kansas State University, between 1994 and 2013.

History and Clinical Examination

Each African Pygmy hedgehog's history, including any previous diagnoses or treatments, was obtained from its medical record. Depending on the nature of the hedgehog, most of the physical examinations were performed under general anesthesia.

Laboratory Testing

In some cases, blood was obtained from the jugular vein under short-term isoflurane gas anesthesia. Occasionally, when only a very small amount of blood was required, the peripheral vessels (cephalic vein, lateral saphenous vein) were used. Blood samples were then submitted for complete blood count and plasma biochemical analysis. When indicated, tissue samples were submitted for cytology, bacteriology, mycology and/or histology tests. Fecal parasitological testing was performed in the cases of diarrhea, progressive weight loss, and some annual health examinations.

Imaging Methods

When clinically indicated, abdominal ultrasonography and two-view (dorsoventral and lateral) whole body radiographs were obtained under general isoflurane gas anesthesia. Computed tomography scan was performed in one case with skull pathology. Echocardiography was performed in one case with suspected cardiac disease.

RESULTS AND DISCUSSION

A total of 106 individual cases were reviewed, out of which 47 animals were intact females and 59 were intact males. The mean age was 26 months (range 1 month to 9.0 years) and mean weight was 348 g (range 112 g to 786 g). The goal of this study was to determine disease occurrence in captive African Pygmy hedgehogs by retrospectively reviewing medical records of cases admitted to a veterinary teaching hospital for clinical evaluation over a time period of 9 years. Description of the observed disease conditions in African Pygmy hedgehogs revealed in this study are summarized in Table 1.

In this study, the oldest animal was 9 years old and 9 other hedgehogs were older than 4 years of age. The expected life span of wild African Pygmy hedgehogs is reported to be up to 4 years, though it has been noted they can live up to 10 years in captivity due to advances in veterinary care

Table 1: Prevalence of health disorders in 106 captive African pygmy hedgehogs from 1994–2013 presented to the College of Veterinary Medicine, Kansas State University.^a

Organ/tissue disease	All hedgehogs % (N=106)
Dermatological disease	66.04
Ectoparasites	46.22
Pododermatitis	3.77
Dermatophytosis	5.66
Otitis externa	2.83
Neoplasia	4.72
Gastrointestinal disease	33.02
Oral squamous cell carcinoma	9.43
Tooth root abscess	4.72
Dental calculus/gingivitis/periodontitis	4.72
Liver disease	3.77
Musculoskeletal disease	15.09
Degenerative joint disease	1.89
Spondylosis	2.83
Annular pedal constriction	4.72
Neurologic disease	11.32
Wobbly hedgehog disease	8.49
Obesity	10.38
Renal disease	9.43
Hematuria	4.72
Interstitial nephritis	0.94
Glomerulopathy	0.94
Multifocal interstitial fibrosis	1.89
Reproductive disorders	8.49
Mammary carcinoma	1.89
Uterine neoplasia	3.77
Endometrial polyps	0.94
Pyometra	0.94
Respiratory disease	7.55
Pneumonia	1.89
Ocular disease	5.66
Cataracts	3.77
Globe proptosis	1.89
Cardiac disease	1.89
Congestive heart failure	1.89
Endocrine disease	1.89
Thyroid gland hypertrophy	0.94
Thyroid carcinoma	0.94
Status ante finem (diagnosis not known)	8.49
Healthy animals	11.32

^a Some animals displayed more than one symptom or disease and were included in more than one group.

(2, 6). In this study, adult hedgehogs weighed 361 g mean for males (range 112 g–770 g) and 369 g mean for females (range 124 g–670 g). The weight of adult hedgehogs has been

reported to be 400–600g for males and 300–400g for females (1).

Dermatologic disease was the most common health disorder seen in hedgehogs, being recorded in 66.04% (70 of 106) of all hedgehogs examined in this study. The most common dermatological disease seen was mite infestation (acariasis) identified in 65.71% (46 of 70) of the dermatological cases. The species of mites was not recorded in every case, but when recorded (5 of 46), the species observed were *Chorioptes*, 60% (3 of 5) and *Caparinia*, 40% (2 of 5). Two cases with fleas and one case with lice were also found.

External parasites (fleas, ticks, and mites), as well as a variety of dermatophytes were commonly seen in hedgehogs in this study and have been previously reported in the literature (8). Acariasis is commonly reported in pet hedgehogs (1). Mites are normal inhabitants of hedgehogs in the wild, but infestation can become severe in ill or immunocompromised animals (7). Similar to what was observed in this study, the most common mite of hedgehogs is *Caparinia spp.* (non-burrowing mite), with reports of *Chorioptes spp.* (burrowing mite) also being implicated (1). However, in many of the cases of mites that were identified in this study, the species was not recorded.

Dermatophytosis was found in hedgehogs in this study with all cases diagnosed as *Trichophyton spp.* based on fungal culture. The most commonly identified organisms in the literature include *Trichophyton spp.* and *Microsporum spp.* (1, 9).

In 4.72% of cases in this study, dental disease, including calculus, gingivitis, and periodontitis was noted, which has commonly been reported in the literature in hedgehogs (1).

Various skeletal diseases have been recorded in hedgehogs (10). Spondylosis was noted on radiographs of three hedgehogs in this study. A case series (n=4) of intervertebral disc disease in hedgehogs noted spondylosis as a radiographic finding in three hedgehogs, hypothesized to be a result of abnormal movement between vertebrae, degeneration of the annulus fibrosis and inflammation with bony proliferation from the protruding disc (10). Annular pedal constriction, as noted in this study in five hedgehogs, causes an interference with the blood supply leading to local congestion, edema, hypoxia, and/or avascular necrosis (11). These injuries can be caused by cage wire, fabric, string, hair, or other fibers (11). Hedgehogs appear to be particularly prone to this injury of a leg, foot or digit, often requiring amputation (11). In this study, removal of the foreign material resulted in return

to normal function of the limb in all but one case which required amputation.

A common presenting complaint of neurologic hedgehogs in this study was ataxia. Neurological disease is reported commonly in hedgehogs in the literature (1). Common causes of ataxia in hedgehogs include torpor, Wobbly Hedgehog Syndrome (WHS), intervertebral disc disease, trauma, toxins, infarcts, malnutrition, and neoplasia (1, 12–13). WHS was the most common cause of ataxia found in this study (8.49%). WHS (as a result of demyelination) is a progressive paralysis in hedgehogs that begins with ataxia and ends in complete paralysis within 15 months of the onset of clinical signs (12, 14). However, intervertebral disc disease (IVDD) can also present with similar signs as WHS (1, 13). Brain tumors have also been reported to present with similar signs as WHS and IVDD with reports of astrocytomas, gemistocytic astrocytomas and microgliomas (12). One report of anaplastic astrocytoma in the spinal cord of a hedgehog has also been reported (15). Additionally, circling, as seen in hedgehogs in this study, may be caused by otitis media/interna or primary neurologic disease (1).

Obesity was found in 10.38% of cases in this study, which is reflective of a previous report (16). Obesity is commonly reported in pet hedgehogs as a result of improper husbandry, including overeating, incorrect diet, lack of exercise, and an ambient temperature that is too cold (16).

Renal diseases in this study were found in 9.43% of cases, but many of the hedgehogs with suspected renal disease were not necropsied to allow a definitive diagnosis. A retrospective study of post mortem findings in 14 African hedgehogs revealed renal disease in 50% of the hedgehogs including tubulointerstitial nephritis, chronic renal infarcts, glomerulopathy, and tubular nephrosis (17). When necropsy was performed in hedgehogs in this study, similar histopathological findings were also described.

In this study, cardiac disease was clinically diagnosed in just 1.89% of cases and necropsy findings from 13.21% of cases revealed no evidence of cardiomyopathy. In a study published in 2000, 38% (16 of 42) of hedgehogs examined on necropsy, were noted to have cardiomyopathy (18).

Cases of leiomyoma and endometrial polyps were found in this study, however some of the suspected cases of uterine disease in this study did not have necropsy or other diagnostic tests performed. Uterine disease in African hedgehogs has been reported in the literature (5, 13, 19–20). The types of

tumors of the uterus reported in hedgehogs in the literature includes adenoleiomyosarcoma, adenosarcoma, endometrial stromal cell sarcoma, endometrial polyps, adenoleiomyoma, uterine adenocarcinoma, carcinosarcoma and uterine spindle cell tumor (5, 13, 18-19). One case of pyometra was found in this study. The predominant cause of abnormal vaginal discharge is reported to be neoplasia but pyometra and metritis have been reported (1, 20, 21).

Neoplasia was the third most common general pathology in hedgehogs observed in 20.75% (22 of 106) of cases in this study, when incorporating all body systems. The most common neoplastic process observed in this study was oral squamous cell carcinoma 45.45% (10 of 22 neoplasias). Mammary gland adenocarcinoma was seen in 9.09% (2 of 22 neoplasias) of cases. Dermal neoplasia was reported in 22.73% (5 of 22) of neoplasia cases.

Oral squamous cell carcinoma was commonly diagnosed in hedgehogs ranging from 1-6 years of age. Oral neoplasms, particularly squamous cell carcinomas are commonly reported in hedgehogs in the literature (1). Oral squamous cell carcinoma was reported as the third most common tumor of the hedgehog preceded by mammary gland adenocarcinoma and lymphoma in a retrospective study, in hedgehogs ranging from 2-5.5 years (4).

In this study, oral squamous cell carcinoma was the most commonly reported neoplasm in 45.45% (10 of 22 neoplasias) of cases, mammary gland adenocarcinoma was seen in 9.09% (2 of 22 neoplasias) of cases, and lymphosarcoma was not reported. Dermal neoplasia was reported in 22.73% (5 of 22) of neoplasia cases, and is also considered relatively common (4). Neoplasia is reported commonly in African hedgehogs in the literature (1, 4-6). There are various reports of tumors and disseminated neoplastic processes in hedgehogs, affecting many body systems (4-6). Several retrospective studies reported various neoplasms in African hedgehogs (1, 4-6). In one retrospective study of 66 hedgehogs, the most common tumors included mammary gland adenocarcinoma, lymphosarcoma, and oral squamous cell carcinoma (4).

Limitations of this study include the accuracy of information available in the record, which is inherent in any retrospective study. The age of the animals was reported by the owners and may not be accurate. The reproductive status was also reported by the owners and verified by the attending clinician.

The population of hedgehogs used in this study is a good representation of the captive hedgehog population,

from both zoologically kept and privately owned hedgehogs, since both primary care and secondary referral cases are included. Additionally, given the large time scale, there was a decreased chance of disease grouping. However, the localized geographical area may represent a localized gene pool which may result in different disease prevalence in other areas of the world.

CONCLUSION

The most common disease in hedgehogs found in this study is dermatological disease, particularly ectoparasites. Gastrointestinal disease, skeletal disease, and neurologic disease were all relatively common presentations. This retrospective study may assist in extending our clinical knowledge of disease prevalence in captive African Pygmy hedgehogs.

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