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CASE REPORT

Anterior uveal spindle cell tumor in a cat

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Abstract

Purpose To describe a case of anterior uveal spindle cell tumor in a cat with features similar to spindle cell tumor of blue eyed dogs.

Methods A 10-year-old female spayed domestic short-haired cat was referred for an iris mass OS. The mass was solitary, nodular, nonpigmented, located medially, and causing dyscoria. A diagnosis of a benign epithelial tumor was suggested by a FNA of the mass. The cat was lost to follow-up for 2 years, after which time she re-presented with glaucoma, blindness and grossly evident iridal mass enlargement OS. Transconjunctival enucleation was performed and the globe submitted for histopathology.

Results Histopathology of the enucleated globe revealed the superior iris to be infiltrated and effaced by a large population of neoplastic spindle cells. The cells were arranged in streams and bundles and exhibited Antoni-A and Antoni-B tissue patterns, which are characteristic of Schwann cell tumors. Mitotic figures were rare and cellular pleomorphism moderate. Immunohistochemical staining was positive for S-100 protein and glial fibrillary acidic protein (GFAP), and negative for Melan-A. Interestingly, there was no histological evidence of glaucoma.

Conclusions Based on its histopathologic characteristics, this iris tumor was diagnosed as a Schwann cell variant of a peripheral nerve sheath tumor (PNST) closely resembling the spindle cell tumor of blue-eyed dogs. Anterior uveal PNST has not been previously reported in cats to the authors' knowledge. The presence of Antoni type A and type B tissue patterns along with immunohistochemical staining may facilitate a diagnosis of PNST and rule out malignant melanoma.

Key Words: cat, iridal mass, intraocular neoplasia, peripheral nerve sheath tumor, schwannoma, spindle cell tumor

INTRODUCTION

Primary and secondary anterior uveal neoplasms have been seen in cats with primary anterior uveal melanoma being the most commonly diagnosed in the cat.[1] Intraocular spindle cell tumors reported in cats include melanocytic tumors, leiomyosarcoma, post-traumatic ocular sarcomas, fibrosarcomas, osteosarcomas and metastatic sarcomas.[1–7] Peripheral nerve sheath tumors (PNST) encompass several pathologic conditions including schwannomas, neurofibromas, perineurinomas and malignant PNST.[8–13] Anterior uveal PNST have recently been reported in dogs but not in cats.[2] This case report describes a slowly progressive nonpigmented iridal mass eventually causing secondary glaucoma and blindness. Diagnosis of this type of tumor in this location has not been reported in cats to the authors' knowledge.

CASE REPORT

A 12-year-old female spayed domestic short-hair cat weighing 4 kg was referred for a progressively enlarging iris stromal mass OS that was noted by the owner 5 days prior to initial examination. On ocular examination a solitary nodular nonpigmented iridal mass on the medial aspect of the iris between 9 o'clock and 1 o'clock, along with mild dyscoria was noted OS (Fig. 1). There was no obvious aqueous or cellular flare noted OS and the remainder of the ophthalmic

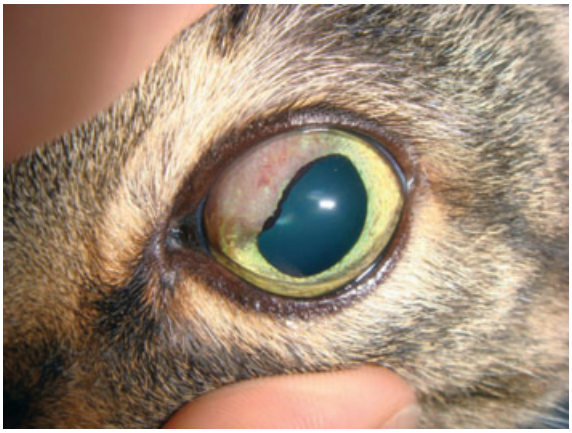

Figure 1. Photograph of OS at initial presentation. Note the solitary nodular nonpigmented iridal mass on the medial aspect of the iris between 9 o'clock and 1 o'clock, along with mild dyscoria.

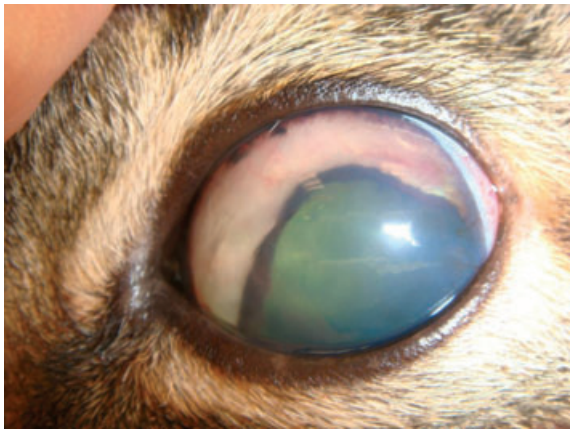

Figure 2. Photograph of OS 2 years following initial presentation. Note the significant enlargement of the iridal mass, severe dyscoria, moderate diffuse corneal edema and buphthalmia.

examination revealed no other abnormalities. OD was examined and found to be normal. Fluorescein staining for both eyes was negative and intraocular pressures were 11 mmHg and 4 mmHg OD and OS respectively via applanation tonometry (Tono-Pen®XL; Reichert Inc., Depew, NY). An ocular ultrasound (12 MHz ophthalmic probe; LINSCAN USB Ophthalmic Ultrasound System, Ocuscience LLC, Kansas City, MO) revealed that the mass was solid and discrete. A fine needle aspirate of the iridal mass was attained under deep sedation with intravenous propofol (PropoFlo™; Abbott Laboratories, North Chicago, IL) and buprenorphine (Buprenorphine HCl; Hospira, Inc., Lake Forest, IL). Post aspiration the cat was discharged with oral Metacam® (Boehringer Ingleheim, Vetmedica, Inc., St. Joseph, MO) for its anti-inflammatory effect and Pred-G® (gentamicin 0.3% and prednisolone acetate 1% ophthalmic suspension; Allergan Inc., Irvine, CA) for topical anti-inflammatory and anti-bacterial components.[14,15] Cytology performed by an outside laboratory with Diff-Quik revealed scattered red blood cells with a few epithelioid-type cells. There was no inflammation or overt atypia noted. A tentative diagnosis of a benign epithelial tumor was suggested. Systemic work-up including complete blood cell count, serum biochemistry panel, thoracic radiographs and abdominal ultrasound was performed and revealed no abnormalities. Two years following the initial tentative diagnosis, the cat represented with buphthalmia, moderate diffuse corneal edema and scleral injection OS. There was an absent menace response and dazzle reflex OS. OD revealed a positive menace response and dazzle reflex. There had been significant enlargement of the iridal mass OS causing severe dyscoria (Fig. 2). Fundic examination of the right eye was normal and the left eye revealed moderate vascular attenuation and a small dark optic nerve head. Intraocular pressures were 18 mmHg and 53 mmHg OD and OS respectively via applanation tonometry. Enucleation was recommended to alleviate pain from the secondary glaucoma as well as for a definitive diagnosis.

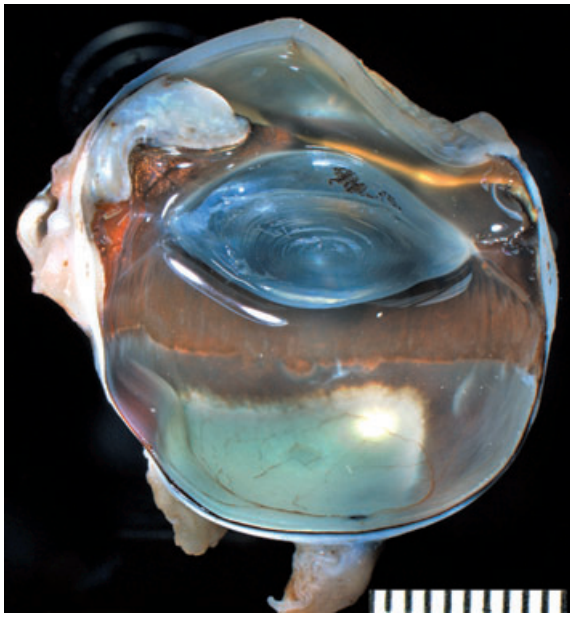

Figure 3. Gross image of the iridal mass (anterior at the top and optic nerve at the bottom). Note the neoplastic infiltration of the superior iris.

A transconjunctival enucleation and placement of an orbital conformer was performed. The globe was submitted for histopathology and evaluated by the Comparative Ocular Pathology Laboratory of Wisconsin (COPLOW) (Fig. 3). Histopathology revealed the mass on the superior iris to be composed of spindle cells packed together with a large number of cells per unit volume. The cells were arranged in streams and bundles and sometimes formed dense aggregates of elongated nuclei palasading around a densely eosinophilic stromal matrix (Antoni-A type tissue pattern) (Fig. 4). In the less cellular areas the cells were embedded in a loose matrix (Antoni-B type tissue pattern). The cells

present had a moderate amount of eosinophilic and elongated cytoplasm with indistinct cell borders, elongated nuclei with finely stippled chromatin and indistinct nucleoli. Mitotic figures were rare (three mitotic figures per 1 HPF) and cellular pleomorphism was moderate. There were adequate numbers of ganglion cells present in the inner retina. Immunohistochemical staining was positive for S-100 protein and glial fibrillary acidic protein (GFAP) and negative for Melan-A (Fig. 5). Based on these findings, the tumor was diagnosed as a Schwann cell variant of a PNST and closely resembles the recently reported spindle cell tumor of blue-eyed dogs.[2]

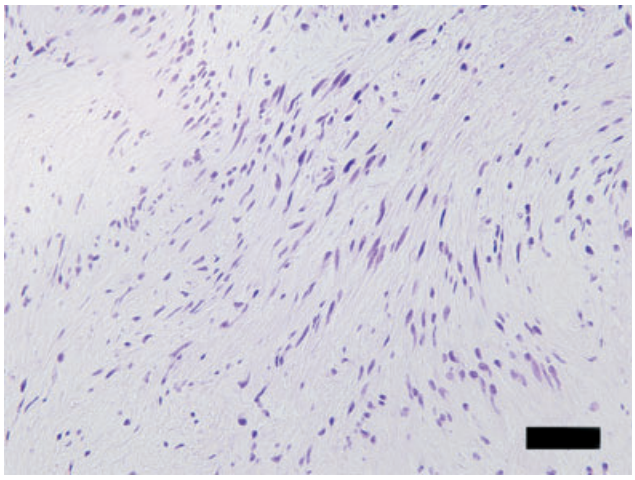

Figure 4. Photomicrograph of the iridal mass. Note the hematoxylin and eosin (H&E) stain revealing cells arranged in streams and bundles and sometimes formed dense aggregates of elongated nuclei palasading around a densely eosinophilic stroma consistent with Antoni-A type tissue pattern (Bar = 50 microns).

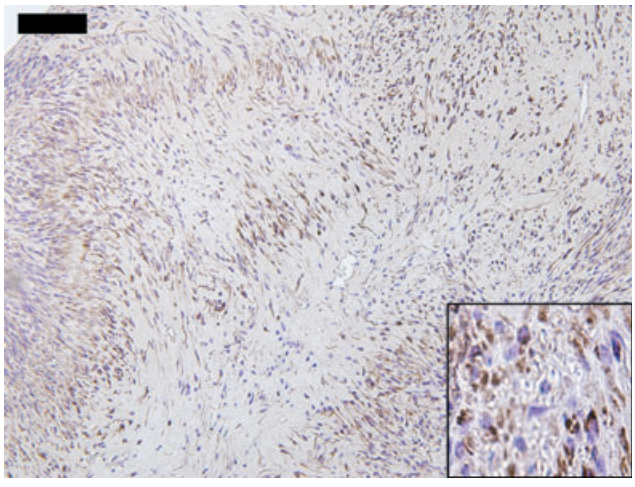

Figure 5. Immunohistochemical staining of the iridal mass was positive for glial fibrillary acidic protein (GFAP). Inset: higher magnification showing positive GFAP staining (Bar = 50 microns).

DISCUSSION

Differential diagnoses for a cat with a nonpigmented anterior uveal mass include metastatic lymphosarcoma, amelanotic melanoma, feline ocular post-traumatic sarcoma, ciliary body adenoma or adenocarcinoma, metastatic mammary adenocarcinoma, metastatic hemangiosarcoma, primary or metastatic squamous cell carcinoma, metastatic disseminated adenocarcinoma, and metastatic endometrial adenocarcinoma.[1,5–11] Schwannomas are comprised almost entirely of Schwann cells and are derived from the myelinating cell of the peripheral nervous system. In people intraocular schwannomas are rare, benign, slow growing, painless PNST.[12–14] Since they are so uncommon they are often misdiagnosed as malignant melanomas.[14] Definitive diagnosis can be difficult. The presence of Antoni type A and type B tissue patterns along with immunohistochemical staining can facilitate a diagnosis of PNST and exclude malignant melanoma. Immunohistochemical staining was necessary in this case to exclude a diagnosis of spindle cell melanoma. Immunohistochemistry was accomplished using automated immunostainer (Ventana Medical Systems Inc., Tuscon, AZ). A biotinylated anti-mouse and anti-rabbit secondary antibody conjugated with alkaline phosphatase-streptavidin. The chromagen used was DAB. After that, the sections were incubated at 37 °C for 32 min, counterstained with hematoxylin, followed with a bluing reagent to change the hue of hematoxylin to blue color (Ventana Medical Systems Inc., Tucson, AZ). S-100 protein is present in cells derived from the neural crest including Schwann cells, melanocytes and glial cells.[16] In the head many mesenchymal tissues are also derived from the neural crest including chondrocytes, adipocytes, myoepithelial cells, macrophages, Langerhan cells, dendritic cells, and keratinocytes. Staining positive for S-100 does not distinguish between PNST and melanoma as both can be immunoreactive for the S-100 protein.[17,18] Melanoma in all cases is expected to stain positive with S-100. Although not entirely specific, S-100 positivity concurrently with other immunohistochemical stains can be helpful in diagnosis of PNST.[8,17] Classically, GFAP staining is specific for astrocytes as well as some other cell types in the central nervous system. It is a protein found normally in glial cells. Examples of neoplasms that stain positive for GFAP include: astrocytoma, glioblastoma, oligodendroglioma, schwannoma, and neurofibroma.[19–21] The Schwann cells of nonmyelinating peripheral nerves (autonomic nerves) also stain positive for GFAP and this phenomenon proved useful in identifying the Schwann cell origin of spindle cell tumor of blue eyed dogs.[2] The final immunohistochemical stain performed was Melan-A. This protein is found on the surface of normal melanocytes as well as melanosomes. Negative staining with Melan-A strongly suggests that this tumor is not of melanocytic origin.[22] Although not pathognomonic for PNST these histologic patterns and stain results are characteristic of PNST and strongly suggest that this tumor is derived from the Schwann cells of

nonmyelinating peripheral nerves.[2,18] This tumor should be considered as a differential diagnosis in any iridal mass arising in a cat.

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