

Possible Unilateral Iris Melanoma in a Cat

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Received 26.05.2023

Accepted 20.10.2023

Published 31.12.2023

Abstract

A tumor known as feline iris melanoma has a high chance of metastasizing and is characterized by multifocal, golden yellow to brown pigmented patches in the iris. Despite the fact that cats of any age can develop this tumor, there is no breed or sex-specific susceptibility. The case material was a female Russian blue cat that was neutered at the age of 5, weighed 4.5 kg, and was taken to the surgical clinic of the faculty of veterinary medicine at the University of Siirt. According to the patient's medical history, a brown spot-like pigmented region had developed on the right eye's iris two months prior, and up until the cat was brought to the clinic, the pigmented patches in the iris grew in number and size. As a result of routine clinical examination, tonometry, haematological and biochemical examinations, uveal cysts and iris freckles with similar clinical symptoms were eliminated and it was concluded that the pathological condition was iris melanoma. In addition, it was determined that melanoma foci were involved only on the iris surface in line with the available possibilities and did not metastasise to other tissues and organs of the eye. Since the disease was in the initial stage, the general condition of the patient was good after clinical examinations and the owner of the patient did not accept enucleation, it was decided not to perform any intervention. The owner of the patient was instructed that during the follow-up phase, the foci should be checked and the patient should continue to be under supervision. When the patient was summoned back for a follow-up examination three months later, it was decided to undertake enucleation in case any potential melanoma foci or metastases had grown in other eye tissues or organs.

Keywords: Cat, iris, melanoma.

Bir Kedide Olası Tek Taraflı İris Melanomu

Öz

Kedilerde iris melanomu; iriste multifokal, altın sarısı renginden kahverengiye kadar değişik pigmente alanlar ile karakterize, yüksek metastaz riskine sahip bir neoplazidir. Bu neoplazi her yaştaki kedilerde görülebilmeye karşın ırk ve cinsiyet predispozisyonu göstermez. Olgu materyalini Siirt Üniversitesi Veteriner Fakültesi Hayvan Hastanesi Cerrahi kliniğine getirilen 5 yaşlı, 4,5 kg ağırlığında, dişi, Russian Blue ırkı, kısırlaştırılmış bir kedi oluşturdu. Hastanın anamnezinde, sağ gözde iris üzerinde 2 ay önce kahverengi nokta şeklinde bir pigmente alanın oluştuğu ve kliniğe getirilene kadar geçen bu süreç içerisinde iristeki pigmente alanların sayıca ve büyüklük olarak arttığı söylendi. Hastada yapılan rutin klinik muayene, tonometri, hematolojik ve biyokimyasal muayeneler sonucunda benzer klinik semptomlara sahip üveal kistler ve iris çilleri elimine edilerek patolojik durumun iris melanomu olduğu kanısına varıldı ve melanom odaklarının eldeki imkanlar doğrultusunda sadece iris yüzeyinde tutulum gösterdiği, gözün diğer dokularına ve organlara metastaz yapmadığı tespit edildi. Hastalığın henüz başlangıç evresinde olması, klinik muayeneler sonucu hastanın genel durumunun iyi olması ve hasta sahibinin enükleasyonu kabul etmemesi nedeniyle herhangi bir müdahalede bulunulmamasına karar verildi. Hasta sahibine ilerleyen süreçte hastanın gözlem altında tutulması ve odakların takip edilmesi gerektiği bilgisi verildi. Üç ay sonra tekrar kontrole çağırılan hastada olası melanom odaklarında bir artış veya gözün diğer dokularında ve organlarda bir metastaz tespit edilmesi durumunda enükleasyon uygulanmasına karar verildi.

Anahtar kelimeler: Kedi, iris, melanom.



Introduction

Numerous conditions that affect the structures in the orbit, eye, and adnexa are included in the diseases that fall under the purview of veterinary ophthalmology. Neoplasms, which can be benign or malignant and ruin a tissue's homeostatic regulatory mechanisms, account for about 39% of ocular diseases in small animals. The tolerance limit for diseases is low due to the anatomy and function of the eye, though; even tiny, non-invasive, and slowly growing tumors can result in serious illness, color changes, and vision loss (Guerra Guimarães et al., 2021).

The iris, corpus ciliare, and choroid make up the uvea, the bulbus oculi's middle layer (Gelatt, 2008). The iris, which gives the eye its color, is a vascular area that is situated behind the cornea layer in the anterior section of the eye. Melanomas are malignant or benign tumors of the melanoblast and the melanocyte (Siripoonsub et al., 2016). According to Payen et al. (2008), melanocytic tumors can form in the skin, mucous membranes, eyes, eyelids, central nervous system, or eyes. Iridial melanomas in cats grow in the anterior uvea. According to Ionaşcu et al. (2012), anterior uveal melanoma is a pathologic condition that often develops unilaterally in cats and is not influenced by age or breed.

The first clinical sign in a patient affected by neoplasia is asymmetric hyperpigmentation of the iris. The hyperpigmented areas may persist for months or years until irregular iris masses develop. As the pigmented areas in the iris grow and coalesce, the iris becomes thicker and less mobile, resulting in iris involvement (Kalishman et al., 1998). Iris involvement is characterized by the presence of pigmented foci that gradually coalesce (over months to years) into larger and thicker pigmented areas and may eventually range from one or more golden yellow to dark brown spots (Gelatt, 2008). Sometimes there is

peripheral spread to the choroid, irido-corneal angle, ciliary body, and scleral venous flexure. This can lead to secondary glaucoma. The tumor that reaches the sclera often extends to the orbit and metastasizes to distant organs by spreading to the cranial cavity via the optic nerve (Siripoonsub et al., 2016). Although tumor metastases are most common in the liver, they can also occur in the lung, kidney, spleen, lymph nodes, brain, and bone tissue (Kayes & Blacklock, 2022). In some cases, melanoma may remain stationary in the iris or develop slowly over time, resulting only in an aesthetic change in the iris (Duncan & Peiffer, 1991).

Malignant melanomas are the most common primary intraocular tumor in cats (Planellas et al., 2010). Reported metastasis rates in cats vary widely, ranging from 19% to 63% (Kayes & Blacklock, 2022). The diagnosis of iris melanoma is definitively made by histopathologic examination after a complete clinical and ophthalmologic examination. Ophthalmoscopy, tonometry, and ocular ultrasound are used to assess thickening of the iris root and ciliary body, determine the shape of the tumor and extent of local invasion, and detect secondary complications such as glaucoma, corneal edema, hyphema, and anterior uveitis (Ionaşcu et al., 2012). The differential diagnosis should consider iris freckles, pigmented choroidal cysts, inflammation-related iridial discoloration, and other choroidal neoplasms (Boydell & Enache, 2012). Advanced cases typically have simple diagnoses, but this reduces the range of available treatments. Currently available treatment options include surgery, cryotherapy, radiotherapy, photodynamic therapy (PDT), and laser, but in the absence of clinical recommendations, the selection of a course of action is largely based on the facilities that are available, the preferences and experiences of the clinicians, and the owner's financial situation (Guerra Guimarães et al., 2021). We present here a case of possible

unilateral iris melanoma in the initial stage that did not metastasize to any tissue or organs.

Case Description

A female Russian Blue cat, 5 years old and weighing 4.5 kg, was brought to the Siirt University Veterinary Faculty Animal Hospital Surgery clinic. In the anamnesis, it was reported that a brown spot-shaped focus had developed in the right eye of the cat two months prior, and that over time, it had grown in number and volume without impairing the patient's vision. Regular general examination results, including those of the mucous membranes, lymph nodes, body temperature, heart rate, respiratory rate, peripheral pulse quality, capillary refill time (CRT), thoracic auscultation, and belly palpation, were normal. Inspection of the right eye revealed that there were approximately 15 brown pigment foci on the iris, irregularly distributed and more intense at 11-1 o'clock (Figure 1).



Figure 1. Brown pigmented areas irregularly distributed on the surface of the iris in the right eye.

The pupillary light reflex, assessed by shining light into the patient's right eye, was normal. Direct ophthalmoscopic examination of the right eye revealed that there was no pathology of the ciliary body, vitreous humor, optic disc, and other structures, and only brown pigment spots were observed on the surface of the iris (Figure 2). Intraocular pressure was measured three times with a rebound tonometer (Icare ic100, Hasvet,

Türkiye) and the mean value was obtained. The mean results (right eye 21.33 mm/Hg, left eye 19 mm/Hg) (reference range 15- 30 mm/Hg, Von Spiessen et al., 2015) were within the reference range.



Figure 2. Brown pigmented foci in the iris of the right eye.

Table 1. Haemogram findings

Parameter	Result	Reference Ranges
WBC (x 10 ³ /uL)	5.8	5.5-19.5
Lenf (x 10 ³ /uL)	2.5	1.5-7.0
Mon (x 10 ³ /uL)	0.2	0-0.85
Gran (%)	3.1	—
Lenf (%)	42.2	20-55
Mon (%)	4.7	1-4
RBC (x 10 ⁶ /uL)	10.17	5.0-10.0
HGB (g/dL)	17.0	8.0-15.0
HCT (%)	51.4	24-45
MCV (fL)	50.6	39.0-55.0
MCH (pg)	16.7	12.5-17.5
MCHC (g/dL)	33.0	30.0-36.0
RDW (%)	14.7	13.8-21.1
PLT	206	—
Eos (%)	2.8	2-12

WBC: White Blood Cell, Lenf: Lenfosit, Mon: Monosit, Gran: Granulocyte, RBC: Red Blood Cell, HGB: Hemoglobin, HCT: Hematocrit, MCV: Mean Corpuscular Volume, MCH: Mean Corpuscular Hemoglobin, MCHC: Mean Corpuscular Hemoglobin Concentration, RDW: Red Cell Distribution Width, PLT: Platelet, Eos: Eosinophil, Reference Range: Yılmaz, 2022.

Clinical and direct ophthalmoscopic examination of the left eye revealed no pathologic findings. In the complete blood count, red blood cell (RBC), haemoglobin (HGB) and hematocrit (HCT) values were observed above the reference values

due to insufficient fluid intake of the animal before the examination (Table 1). In serum biochemical analyses, albumin (ALB), blood urea nitrogen (BUN) and amylase (AMLY) values, which were higher than reference values, and lactate dehydrogenase (LDH) value, which was lower than reference values, were not found to be significant considering their clinical reflections (Table 2).

Table 2. Biochemistry findings

Parameters	Results	Reference Ranges
AST (IU/L)	21.0	10-80
ALT (IU/L)	78.0	10-80
GGT (IU/L)	1.0	1-10
TP (g/dL)	7.1	5.4-7.8
ALB (g/dL)	4.7	2.1-3.9
ALP (IU/L)	21.0	10-80
BUN (mg/dL)	53.6	10-30
CRE (mg/dL)	1.43	0.8-1.8
TBIL (mg/dL)	0.20	0.1-0.6
DBİL (mg/dL)	0.02	0-0.3
AMYL (IU/L)	2251.0	500-1800
LIPAZ (IU/L)	36.0	23-375
HDL (mg/dL)	144.3	—
LDL (mg/dL)	18	—
TRIG (mg/dL)	64.0	10-114
CHOL (mg/dL)	204.0	90-205
CK (mg/dL)	67.0	50-450
CK-MB (mg/dL)	26	—
Mg (mEq/L)	2.27	1.5-3.5
Cl (mEq/L)	120.0	117-123
Fe (µg/L)	100.0	68-215
Na (mEq/L)	156.0	147-156
K (mEq/L)	4.71	3.8-4.5
CRP (mg/L)	1.5	—
LDH (IU/L)	71.0	75-490
P (mg/dL)	4.45	1.8-6.4

AST: Aspartate Aminotransferase, ALT: Alanine Transaminase, GGT: Gama-Glutamyl Transferase, TP: Total Protein, ALB: Albumin, ALP: Alkalen Phosphatase, BUN: Blood Urea Nitrogen, CRE: Creatinin, TBIL: Total Bilirubin, DBİL: Direct Bilirubin, AMYL:Amilase, HDL: High-Density Lipoprotein, LDL: Low-Density Lipoproteins, TRIG: Triglyceride, CHOL: Cholesterol, CK: Creatin Kinase, CK-MB: Creatine Kinase-MB, Mg: Magnesium, Cl: Clor, Fe: Iron, Na: Sodium, K: Potassium, CRP: C-Reactive Protein, LDH: Lactate Dehydrogenase, P: Phosphorus, Reference Range: Turgut, 2000.

The differential diagnosis was made by the fact that iris freckles with similar clinical symptoms are congenital and iris cysts have a darker

pigmentation. According to the clinical, hematological and biochemical test results, it was determined that the disease was still in the early stage and the melanoma foci had not yet developed, so it was decided to keep the patient under observation and follow up the foci. After three months, the patient was called in for a follow-up appointment, and it was determined to undertake enucleation in case the potential melanoma foci increased or metastasized to other eye tissues or organs.

Discussion

While intraocular melanomas can develop in adult cats of any age, they are most common in animals nine years of age and older, are typically unilateral, and lack race or gender predisposition (Boydell & Enache, 2012). Although the patient in this case was an adult (5 years old), the melanoma formed unilaterally despite the fact that he was not quite nine years old, in contrast to what is stated in the literature. The most prevalent intraocular neoplasia in cats is uveal melanomas. This neoplasia often develops as multifocal hyperpigmented regions with substantial local invasion of the anterior uvea on the anterior aspect of the iris. On the iris in this case, there were numerous, unevenly spaced brown hyperpigmented areas. These hyperpigmented regions, which only affected the front surface of the iris, were discovered to be denser around 11 and 1 o'clock.

Neoplastic infiltration along the ciliary body and sclera results from infiltration into the iridocorneal angle as the neoplasia advances. Secondary problems such corneal edema, hyphema, anterior uveitis, and glaucoma may emerge as a result of these metastatic occurrences. According to Kalishman et al. (1998), secondary glaucoma is a sign of diffuse melanoma with a bad prognosis and shortened survival. The patient did not have secondary glaucoma, as evidenced

by the intraocular pressure measurements in this case (right eye 21.33 mm/Hg, left eye 19 mm/Hg), which were both within the reference range. We also concluded that the patient had a good prognosis because direct ophthalmoscopy showed that other problems such corneal edema, hyphema, and anterior uveitis did not manifest.

Despite having a longer development period than dermal melanoma in cats, intraocular melanoma is typically thought to have a higher malignant potential (Patnaik & Mooney, 1988). The reported rates of metastasis for this neoplasm range greatly, from 19% to 63%. The liver is the site of tumor metastasis most frequently, although it can also happen there as well as in the lungs, kidneys, spleen, lymph nodes, brain, and bone. It is possible for melanoma to remain stable in the iris or to grow slowly over time, leaving the iris simply cosmetically altered in some circumstances (Kayes & Blacklock, 2022). According to the research, hyperpigmented areas involved in the iris surface in our case did not spread to other eye tissues or organs and instead just altered the iris' appearance.

Conclusion

The patient owner was therefore notified that the patient needed to be kept under observation and that the foci needed to be watched over going forward. When the patient was brought back for follow-up three months later, it was agreed to conduct enucleation in case there was an increase in potential melanoma foci or metastasis to other eye tissues and organs. Additionally, it has been determined that other veterinarians working in small animal clinics will benefit from learning about this uncommon feline pathology.

Financial Support

This study did not receive a grant by any financial institution/sector.

Ethical Statement

This study does not present any ethical concerns.

Author Contributions

Investigation: S.K.; M.B.; Material and Methodology: G.A.; M.B.A.; Supervision: M.B.A.; G.A.; Visualization: S.K.; M.B.; Writing-Original Draft: S.K.; M.B.; Writing-review & Editing: M.B.A.; G.A.; S.K.; M.B.;

Conflict of Interest

The authors declared that there is no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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