Ocular and Periocular Tumors in Cats

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Anatomic distribution of feline primary ocular neoplasia (n = 2599)

- Globe: 82%
- Conjunctiva: 12.3%
- Eyelid: 4.4%
- Orbit: 1.15%
Feline tumors of the Globe (n = 2136)

- Other: 13
- FOPTS, Osteo/Chondrosarcoma: 33
- FOPTS, Round Cell Variant: 64
- Iridociliary Epithelial Tumor: 124
- FOPTS, Spindle Cell Variant: 148
- Melanoma: 1754
Melanoma: 
1510 of 2766 tumors or 55%

- Diffuse Iris Melanoma ... 1340 (263 Early)
- “Atypical” ..... 27
- Limbal .......... 46
- Conjunctival... 27
- 70 mostly DIM improperly labeled

A matched observational study of survival in cats with enucleation 
Typical Clinical Appearance of Feline Diffuse Iris Melanoma

Asymmetrical Darkening of the Iris
This process can occur rapidly or it can take years
Typical Histopathologic Appearance of Feline Diffuse Iris Melanoma
Typical Gross Appearance of Feline Diffuse Iris Melanoma
Ages of Cats with Melanosis, Early Melanoma, Melanoma, and Extensive Melanoma

Progression of Feline DIM

Melanosis n = 84
Ages of Cats with Melanosis, Early Melanoma, Melanoma, and Extensive Melanoma

Progression of Feline DIM

Early Melanoma n = 325
Ages of Cats with Melanosis, Early Melanoma, Melanoma, and Extensive Melanoma

Melanoma (not extensive)  n = 1242
Ages of Cats with Melanosis, Early Melanoma, Melanoma, and Extensive Melanoma

Progression of Feline DIM

Extensive Melanoma n = 272
Metastatic Potential of Feline Diffuse Iris Melanoma

All of the cases with metastasis in the COPLOW collection were extensive in the original enucleation.
Evisceration Followed by Intrascleral Prosthesis is **Not Recommended** in Cats with FDIM
Cats with Extensive FDIM at the Time of Enucleation are More Likely to Have a Shortened Life
Early Stages of Feline Diffuse Iris Melanoma:

- Melanosis
- Early Melanoma
Melanosis

Proliferating melanocytes are entirely limited to the anterior surface of the iris.
Melanosis
Early FDIM
Tumor confined to the iris
Early FDIM
Feline Ocular Post-traumatic Sarcoma: 325 of 4035 tumors, or 5.5%

Male Bias

- **Spindle cell variant, 67%**
  - 217 cases, 43 “early”
  - Lens epithelial origin

- **Round cell variant, 21%**
  - 69 cases, 5 “early”
  - Variant of lymphoma

- **Osteosarcoma/Chondrosarcoma, 10%**
  - 33 OSA cases
  - 6 Chondrosarcoma cases
  - Unknown cell of origin
Feline Ocular Post-traumatic Sarcoma

• Almost all cases have documented chronic eye disease
  – 81 cases have a documented traumatic event
  – Time between trauma and enucleation
    • 60 cases have the dates recorded
    • Average time is 6.35 years
    • Range is 1 to 17 years
Reasons to believe FOPTS is related to trauma

- Lens capsule rupture
- History of trauma or abnormal eye
- Time between trauma and tumor
  - Between 2 months and 15 years
Spindle Cell PTS
Tumor Distribution in the Spindle Cell Variant
Feline Ocular Post-traumatic Sarcoma, Spindle Cell Cell Variant
Feline Ocular Post-traumatic Sarcoma, Spindle Cell Variant
Cellular Features of Spindle Cell FOPTS

Collagen 4

Vimentin

αA Crystallin
Feline Ocular Post-traumatic Sarcoma, Spindle Cell Variant
Follow-up Spindle Cell Variant

• Cases which have extended beyond the sclera have a bad prognosis
  – Local recurrence
  – Extension towards the brain
• Cases removed within the sclera have a good prognosis
• 8% of traumatized globes removed prophylactically have early FOPTS
Round Cell Variant FOPTS
Round Cell Variant FOPTS
Round Cell Variant FOPTS
FOPTS Osteosarcoma
Feline OPTS: Osteosarcoma
Feline Iridociliary Epithelial Tumors

- 102 of 2766 neoplastic cases, ~4%
- Tend to be non-pigmented
- Solid
- Cavitated
- About half have metaplastic bone
- Vimentin+, Cytokeratin-
Feline Iridociliary Epithelial Tumors
Feline Iridociliary Adenoma
Feline Iridociliary Adenoma
Feline Iridociliary Adenoma
Spindle Cells
Feline Iridociliary Epithelial Tumors

Immunohistochemistry

*Vimentin*+ 34%

*Cytokeratin*+ 20%
Not related to tumor type

*NSE*+ 100%
Feline Conjunctival Tumors (n=319)

- Other: 10
- Mucoepidermoid Carcinoma: 13
- Hemangioma: 14
- Hemangiosarcoma: 16
- Tumor of the 3rd Eyelid Gland: 26
- Melanoma: 50
- Squamous Cell Carcinoma: 190
Feline Conjunctival and Lid Squamous Cell Carcinoma

- Total SCC in the Database: 233
- Multifocal (Bowenoid): 15
- Orbital: 30
- Associated with lymphocytic inflammation: 53
- No age or breed associations
Feline Conjunctival and Lid Squamous Cell Carcinoma
Feline Conjunctival and Lid Squamous Cell Carcinoma
Multifocal or Bowenoid
Feline Orbital Squamous Cell Carcinoma

DDx Feline Restrictive Orbital Myofibroblastic Sarcoma
Feline Conjunctival and Lid Squamous Cell Carcinoma
Severe Lymphocytic Inflammation
Feline Conjunctival Melanoma

• 46 cases in the COPLOW database
Feline Conjunctival Surface Adenocarcinoma

• Formerly Mucoepidermoid Carcinoma
• 18 cases in the COPLOW database
• Malignant potential
Feline Conjunctival Surface Adenocarcinoma
Feline Conjunctival Surface Adenocarcinoma
Metastatic Potential
Feline Eyelid Tumors
(n = 114)

- Other: 11
- Spindle Cell Tumor: 16
- Melanoma: 12
- Mast Cell tumor: 14
- Apocrine Gland Tumor: 30
- Peripheral Nerve Sheath Tumor: 31
Feline Hidrocystoma
Apocrine gland origin
Siamese predilection
Feline Eyelid Peripheral Nerve Sheath Tumor

36 cases in the COPLOW Database

H&E Antoni A pattern  Bar=50 microns
Feline Eyelid or Conjunctival Mast Cell Tumors

55 Cases in the COPLOW Database

• All but 3 are cutaneous
• Most common at medial canthus
Feline Tumors of the Orbit (n = 30)

- Other: 2
- Liposarcoma: 2
- Chondroma: 2
- Meningioma: 2
- Lacrimal Adenocarcinoma: 3
- Osteosarcoma: 4
- Anaplastic Sarcoma: 6
- Fibrosarcoma: 9
Feline Restrictive Orbital Myofibroblastic Sarcoma
FROMS
(formerly, Feline Orbital Pseudotumor)

14 cases of FROMS

- **Breed:**
  - 9 DSH
  - 3 DLH
  - 1 Maine Coon
  - 1 unknown

- **Gender**
  - MN = 5
  - FS = 9

- **Age**
  - Mean = 10.5 years, Median = 10 years
  - Range = 4 - 16 years

- **Unilateral** = 13
- **Bilateral** = 1
- **Oral lesions** = 1
Clinical Characteristics

- Restricted mobility of globe and eyelids
- Thickened and distorted eyelids
- Profound corneal disease
FROMS Clinical Characteristics

- Thickening +/- ulceration of lips
- Proliferative gingival lesions (neoplastic?)
• Local extension to adjacent tissues

• Thickening and effacement along fascial planes
Feline Restrictive Orbital Myofibroblastic Sarcoma
Feline Restrictive Orbital Myofibroblastic Sarcoma
Feline Restrictive Orbital Myofibroblastic Sarcoma

Lymphocytic Foci
Subepithelial neoplastic cells are not SMA+, unlike the remainder of the tumor.
Orbit from necropsy specimen

- Tooth
- Orbit
- Tumor in bone
FROMS Histopathology:
• Spindle cells in irregular short bundles with collagenous matrix
• Bland nuclear profile
• Mitotic activity virtually absent
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Clinical Progression & Survival

- 9 of 10 cases with adequate follow-up had spread to the contralateral eye and/or oral cavity/lips
- All cats (5) that were confirmed deceased were euthanized due to progressive FROMS
- Of 3 cats currently living, 2 have signs of progressive FROMS
Feline Restrictive Orbital Myofibroblastic Sarcoma: Summary

- FROMS behavior is locally invasive and severely restricts the mobility of globe, eyelids and lips
- Morphology suggests an infiltrative myofibroblastic sarcoma, seldom forms a mass lesion, lacks cellular atypia
- Diagnosis requires histopathology plus clinical picture
- Distribution and extent in the oral cavity and elsewhere in the head is not obvious at the first diagnosis but becomes very apparent at necropsy
Squamous Cell Carcinoma masquerading as FROMS