

CASE REPORT

Canine low-grade intra-orbital myxosarcoma: case report

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Abstract

Objective The aim of this study was to evaluate important clinical, morphological, histopathological, histochemical, and immunohistochemical characteristics in order to establish the diagnosis and prognosis of a low-grade intra-orbital myxosarcoma.

Animal studied A mongrel dog presented a 2-year history of a neoplastic mass behind the right eye.

Results The neoplasm presented a mesenchymal spindle and stellate cell proliferation with an abundant myxoid matrix, moderate anisocariosis, and a low mitotic index. It stained positive for vimentin, moderately positive for periodic acid-Schiff, and negative for Gomori trichrome stain and α -smooth muscle actin.

Conclusions One year following surgical excision, the patient remains disease free. The histological findings established a diagnosis of a rare canine intra-orbital low-grade myxosarcoma.

Key Words: dog, myxosarcoma, neoplasm, orbital

INTRODUCTION

Soft tissue sarcoma is a heterogeneous group of neoplasms of mesenchymal origin which represent 15% and 7% of all tumors of skin and subcutaneous tissues in dogs and cats, respectively.¹ Myxoid soft tissue tumors are rare in domestic animals.² According to the classification of the World Health Organization (WHO), the main variants in dogs are myxoma and myxosarcoma, as well as the myxoid liposarcoma.³ The chief distinguishing feature is the presence of mucin in the intercellular matrix. The tumors can occur at any site, but the skin is most commonly affected in canines, while the heart, liver, and spinal canal are considered unusual locations in this species.² Five myxosarcomas involving the orbit have been described in a previous study that suggests that the orbit may be a predilection site for myxosarcoma in the dog.⁴

The biological behavior of myxosarcomas is characterized by a tendency for local invasion and a relatively high recurrence rate after surgical resection.^{5,6} Metastases are rarely described and are mostly found in the lung and regional lymph nodes.^{7–9} Therefore, the prognosis of myxosarcomas is poor due to high rate of local recurrence and metastasis.^{10–12}

The aim of this work was to evaluate important clinical, morphological, histopathological, histochemical, and immunohistochemical characteristics in order to establish the diagnosis and prognosis of a low-grade intra-orbital myxosarcoma.

CASE REPORT

A mongrel dog presented a 2-year history of a neoplastic mass behind the right eye. Surgical excision of the tumor was performed through routine enucleation, and no metastasis was seen through chest radiographs and abdominal ultrasound.

Histochemical staining included periodic acid-Schiff (PAS) and Gomori trichrome (GT). Immunohistochemical staining included smooth muscle α -actin (α -SMA) and vimentin. Macroscopic examination of the surgical specimen measured 4.4 × 4.0 × 3.1 cm, and the tumor measured 2.7 cm in diameter. The neoplasm was circumscribed and presented a solid and uniform aspect of firm consistency and whitish color (Fig. 1). Microscopic examination revealed a mesenchymal spindle and stellate cell proliferation and an abundant myxoid matrix. Cells were characterized by moderate anisocariosis, clear cytoplasm, and a

mitotic index of approximately one mitosis per field at 40 \times magnification (Fig. 2). The histological grading system for soft tissue sarcomas evaluates neoplastic differentiation, mitotic index, and necrosis and classifies sarcomas in low, intermediate, and high grades.¹ In our report, the myxosarcoma was classified as low grade due to the presence of well-differentiated neoplastic cells, low mitotic index, and absence of necrotic areas. The extracellular and intracellular components of the tumor were moderately PAS positive, confirming the production of mucopolysaccharides by tumor cells that constitute the extracellular matrix (Fig. 3). The same matrix was negative for GT, demonstrating the absence of collagen. The tumor was positive for vimentin, confirming a mesenchymal origin (Fig. 4). Tumor cells were not stained for α -SMA, denying a myoepithelial origin. Therefore, the neoplasm was diagnosed as a low-grade myxosarcoma. One year following surgical excision, the patient remains disease free, with no evidence of local recurrence or metastasis.

DISCUSSION

Myxosarcomas are rare soft tissue sarcomas^{5,6} that may occur at any anatomic location of the body, but the skin and subcutaneous tissue are the most common locations.¹ Myxosarcomas are macroscopically characterized by a slightly elevated and poorly circumscribed mass and are usually located in the dermis or subcutaneous tissue.^{8,13,14} To the author's knowledge, this is the first report of a canine low-grade myxosarcoma localized solely in the intra-orbital space. Previous reports have described five myxosarcomas involving the orbit characterized by larger tumors with solid and cystic components and infiltrative growth causing adjacent areas of osteolysis;⁴ in addition to a myxosarcoma involving the brain, retrobulbar space and



Figure 1. Macroscopic image of the canine eye presenting an intra-orbital low-grade myxosarcoma.

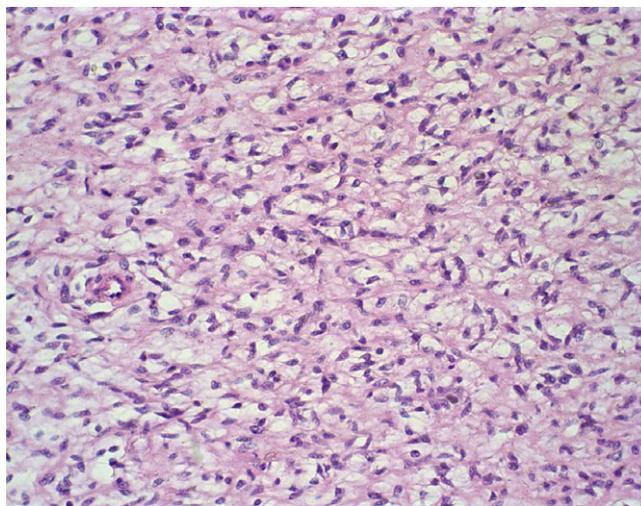


Figure 2. Neoplastic cells presenting moderate pleomorphism containing abundant and vacuolated cytoplasm, at times presenting a stellate aspect. HE, 40 \times .

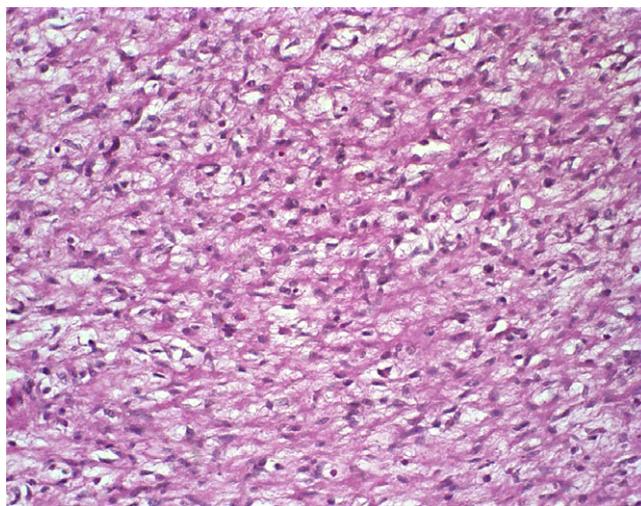


Figure 3. Neoplastic cells presenting moderately positive PAS content in the extracellular and intracellular component. Periodic acid-Schiff, 40 \times .

eye of a dog,¹⁵ orbital myxomas and myxosarcomas have been reported as rare tumors in humans.¹⁶

Orbital myxoid variants of a leiomyosarcoma likely arising from the iris dilator muscle in a male cat and of a leiomyoma in the iris of a dog have been previously described in the literature.^{17,18} In both case reports, enucleation was the recommended treatment protocol and diagnosis was based on morphologic features and immunohistochemical analysis, as described in the present case.

Orbital and intracranial neoplasms may be primary, secondary to extension of adjacent tumors into the orbit or cranium, or the result of distant metastasis. In cats and dogs, more than 70% of orbital tumors are primary

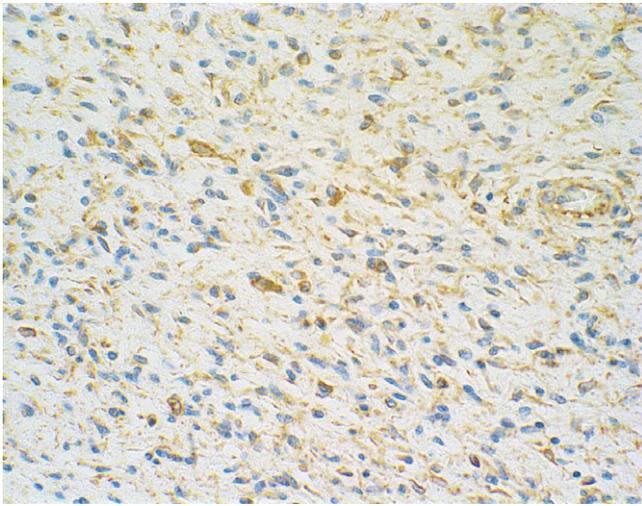


Figure 4. Neoplastic cells presenting vimentin-immunoreactive epithelial cells stained in brown (cytoplasm). ADVANCE HRP™. Antivimentin antibody, counterstained with Harris's hematoxylin, 60×.

tumors. In addition, more than 90% of orbital tumors are malignant,¹⁵ as was seen in the present study.

Myxosarcomas are histologically characterized by proliferation of fibroblasts loosely arranged amid a myxoid matrix rich in polysaccharides,^{1,7} as demonstrated in this report. Moderate anisocariosis, high cellularity, and nuclear atypia were important features to distinguish the reported case from a myxoma. Nuclei are usually small and hyperchromatic, and mitoses are rare.⁷

Due to overlapping features of histological patterns, soft tissue sarcomas represent a diagnostic challenge. Morphologically, myxosarcomas should be differentiated from liposarcomas, fibrosarcomas, and leiomyosarcomas.^{7,8} Morphological characteristics were sufficient to rule out a diagnosis of liposarcoma, while the negative α -SMA and GT stains ruled out a diagnosis of leiomyosarcoma and fibrosarcoma, respectively.

This study demonstrated a distinct myxosarcoma with characteristics related to better prognosis, such as low histological grade and low mitotic index, contrary to literature findings that associate poor prognosis to this neoplasm.^{10–12} The studied histopathological, histochemical, and immunohistochemical techniques were important to obtain prognostic information and an adequate diagnosis.

CONCLUSION

Histopathological and immunohistochemical findings enabled the diagnosis of a rare canine intra-orbital low-grade myxosarcoma. Histological-grade analysis of this

neoplasm is important to distinguish myxosarcomas that may be associated with good prognosis.

REFERENCES

- Liptak JM, Forrest LJ. Soft Tissue Sarcomas. In: *Withrow & MacEwen's Small Animal Clinical Oncology*, 5th edn. (ed. Withrow SJ, Vail DM, Page RL). W.B. Saunders Company, Philadelphia, 2013; 356–380.
- Pulley LT, Stannard AA. Tumors of the skin and soft tissues. In: *Tumors in Domestic Animals*, 2nd edn. (ed. Moulton JE). University of California Press, Berkeley, 1978; 33–34.
- Hendrick MJ, Mahaffey EA, Moore FM *et al.* *Histological Classification of Mesenchymal Tumors of Skin and Soft Tissues of Domestic Animals*. Armed Forces Institute of Pathology, American Registry of Pathology, Washington DC, 1998; 12–18.
- Dennis R. Imaging features of orbital myxosarcoma in dogs. *Veterinary Radiology & Ultrasound* 2008; **49**: 256–263.
- Ettinger SN. Principles of Treatment for Soft-Tissue Sarcomas in the dog. *Clinical Techniques in Small Animal Practices* 2003; **18**: 118–122.
- Luong RH, Baer KE, Craft DM *et al.* Prognostic significance of intratumoral microvessel density in canine soft-tissue sarcomas. *Veterinary Pathology* 2006; **43**: 622–631.
- Gross TL, Ihrke PJ, Walder EJ. *Veterinary Dermatopathology: A Macroscopic and Microscopic Evaluation of Canine and Feline Skin Disease*. Mosby: St. Louis, 1992; 520.
- Scott DW, Miller WH, Griffin CE. *Muller & Kirk – Dermatologia Dos Pequenos Animais*, 6th edn. Saunders Company: Philadelphia, 2001; 1528.
- Goldschmidt MH, Hendrick MJ. Tumors of the skin and soft tissues. In: *Tumors in Domestic Animals*, 4th edn. (ed. Meuten DJ). Iowa State, Ames, 2002; 44–117.
- Spangler WL, Culbertson MR, Kass PH. Primary mesenchymal (nonangiomatous/nonlymphomatous) neoplasms occurring in the canine spleen: anatomic classification, immunohistochemistry, and mitotic activity correlated with patient survival. *Veterinary Pathology* 1994; **31**: 37–47.
- Briggs OM, Kirberger RM, Goldberg NB. Right atrial myxosarcoma in a dog. *Journal of the South African Veterinary Association* 1997; **68**: 144–146.
- Liu S, Wang Z, Chen AQ *et al.* Cardiac myxoma and myxosarcoma: clinical experience and immunohistochemistry. *Asian Cardiovascular and Thoracic Annals* 2002; **10**: 8–11.
- Hargis AM. Sistema tegumentar. In: *Patologia Veterinária Especial de Thomson*, 2nd edn (ed. Carlton WW, McGavin MD). ARTMED, Porto Alegre, 1998; 486–540.
- Goldschmidt MH, Shofer FS. *Skin Tumors of the Dog and Cat*. Pergamon, Oxford, 1992; 316.
- Richter M, Stankeova S, Hauser BG *et al.* Myxosarcoma in the eye and brain in a dog. *Veterinary Ophthalmology* 2003; **6**: 183–189.
- Blodi FC. Unusual orbital neoplasms. *American Journal of Ophthalmology* 1969; **68**: 407–412.
- Billson FM, Mould JRB, Lee WR. Myxoid leiomyoma of the iris in a dog. *Veterinary ophthalmology* 2003; **6**: 173–176.
- Labelle P, Holmberg BJ. Ocular myxoid leiomyosarcoma in a cat. *Veterinary ophthalmology* 2010; **13**: 58–62.