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# Ocular glioma in dog: Case report

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**Abstract.** The objective is to report the case of a Transmontano Mastiff dog, eight year old intact male, 88 kg, with history of visual loss, diffuse corneal edema and secondary glaucoma. The ocular ultrasound examination revealed a hyperechoic structure located in the peripapillary region of the optic nerve, showing an image compatible with intraocular neoplasia. The animal was submitted to the enucleation procedure and anatomopathological analysis of the affected eye was performed. Histological examination revealed glioma of the optic nerve, considering that neoplasms that affect the retina and optic nerve are rarely described in veterinary medicine, as the case presented.

**Keywords:** Intraocular neoplasm, ocular ultrasound, ophthalmological exam, optic nerve

# *Glioma ocular em cão: Relato de caso*

**Resumo.** Objetivou relatar o caso de um Cão de Gado Transmontano, macho, 88 kg, oito anos, com histórico de perda visual, edema de córnea difuso e glaucoma secundário. O exame de ecografia ocular, revelou estrutura hiperecóica localizada na região peripapilar do nervo óptico, mostrando imagem compatível com neoplasia intraocular. O animal foi submetido ao procedimento de enucleação e análise anatomopatológica do olho acometido. O exame histológico revelou glioma de nervo óptico, visto que neoplasias que acometem retina e nervo óptico raramente são descritas em medicina veterinária, como o caso apresentado.

**Palavras-chave:** Ecografia ocular, exame oftalmológico, neoplasia intraocular, nervo óptico

## Introduction

Primary neoplasms affecting the retina and optic nerve are rare in all species (Gelatt et al., 2012; Maggs et al., 2017). Gliomas are neuroectodermal neoplasms which can affect the retina and optic nerve and should be considered differential diagnoses of intraocular neoplasms (Bartlett et al., 2010; Withrow et al., 2020). Neuroectodermal neoplasms include adenocarcinomas, ciliary adenomas, astrocytomas, medulloepitheliomas, retinoblastomas and gliomas (Bartlett et al., 2010; Gelatt et al., 2012).

Affected animals may have visual loss, extensive retinal hemorrhage, secondary glaucoma, among other manifestations (Laus & Oriá, 1999; Maggs et al., 2017). Usually present low potential for metastasis, but ascending invasion to the ventral part of the brain may occur (Naranjo et al., 2008; Oriá et al., 2015).

Imaging techniques should be used in the diagnosis, helping to outline the tumor extension and surgical planning (Maggs et al., 2017). Ocular gliomas are rarely described in veterinary medicine; thus, the objective is to report the clinical case of a dog with optic nerve glioma.

## Case report

A Transmontano Mastiff dog, 8 years old intact male, 88 kg, was examined due to an opaque left eye. The animal had a previous history of uveitis and was undergoing treatment for rickettsia infection for 15 days, receiving oral 10 mg/kg of doxycycline every 24 hours. On ophthalmological examination, the left eye with diffuse corneal edema was observed as was moderate conjunctival hyperemia with engorged episcleral vessels, mydriasis as well as discrete hyphemia in the ventral region of the anterior chamber. On retro illumination examination blood clots adhered to the posterior lens capsule were perceived (Figure 1A). The menace response, dazzle reflex, direct and consensual pupillary reflex, were absent in the left eye. Intraocular pressure was measured by applanation tonometry, presenting a value of 75 mmHg.

The contralateral eye presented physiological, with intraocular pressure within the parameters for species. Indirect ophthalmoscopy and gonioscopy did not reveal changes in the right eye whereas in the left eye were not evaluated due to the lack of corneal transparency. The sodium fluorescein test was negative in both eyes.

B-mode ultrasound examination of the left eye was carried out, using a 15 MHz linear probe. Hyperechoic structures in the vitreous chamber were perceived, interconnected and some of these structures move in real time. At the periphery of the hyperechoic structures, multiple moving punctate echoes were present. Such images more compatible with organized bleeding, blood clots or intraocular neoplasia.

Hypotensive therapy was started on the left eye, instituted with dorzolamide hydrochloride eye drops/timolol maleate and latanoprost, one drop every 12 hours and steroidal anti-inflammatory therapy with prednisolone acetate, one drop every 8 hours. Doxycycline was maintained orally every 24 hours and 1 mg/kg of prednisolone was prescribed every 12 hours until reevaluation.

The reassessment took place seven days after the ophthalmologic consultation and intraocular pressure of the left eye was 50 mmHg. The control ultrasound observed a vitreous chamber with reduced punctate echoes and evidence of a hyperechoic structure in the shape of a mushroom located in the peripapillary region (Figure 1B).

In view of the ocular clinical changes and ultrasound findings, surgical treatment was instituted through the enucleation procedure.

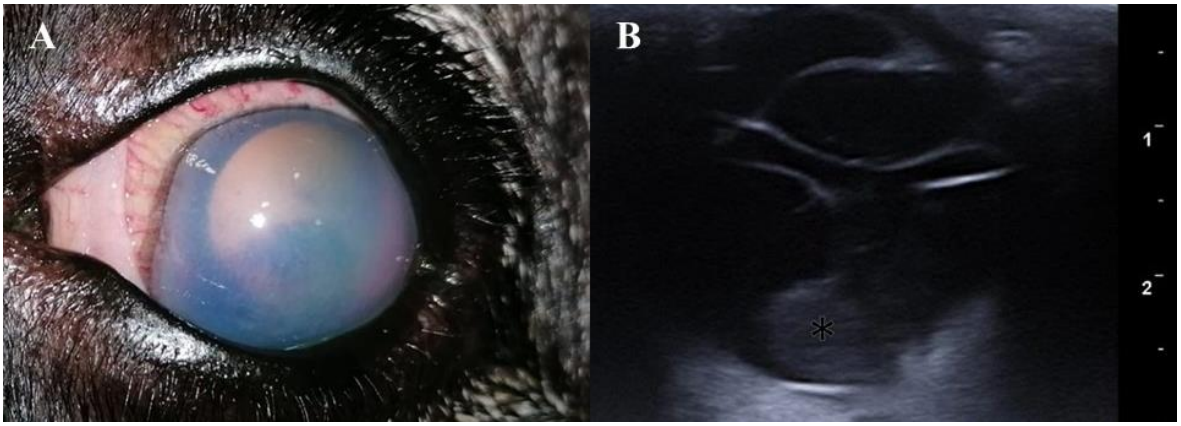


**Figure 1.** Clinical and echographic aspect of the left eye. **A**, Diffuse corneal edema and conjunctival hyperemia with the presence of engorged episcleral vessels, mydriasis and the presence of blood clots attached to the posterior lens capsule. **B**, Ultrasound examination shows hyperechogenic mass (*) in the peripapillary region.

After pre-anesthetic evaluation, the animal was premedicated with methadone, 0.5 mg/kg and dexmedetomidine, 2.5 µg/kg, both intramuscularly, associated with diazepam, 0.4 mg/kg and acepromazine, 0.02 mg/kg, intravenously. Anesthetic induction was performed with propofol at a dose

of 1 mg/kg intravenously, followed by orotracheal intubation. Anesthetic maintenance was carried out with isofluorane vaporized in oxygen.

Trichotomy and aseptic preparation of the left periocular region were performed. The bulb of the eye and the adjacent optic nerve were excised by the enucleation technique using the transconjunctival approach. The excised tissues were submitted to anatomopathological analysis (Figure 2). On the macroscopic inspection, a heterogeneous white intraocular mass measuring 0.6 x 0.5 cm, adhered to the insertion area of the optic nerve, with growth towards the vitreous chamber was seen. Microscopy revealed a population of cells ranging from ovoid to spindle cells arranged in nests and bundles. The cells present a clear cytoplasm and a central ovoid nucleus, with extensive hemorrhagic foci and several foci of necrosis. No mitosis was identified, characterizing the result of optic nerve glioma.

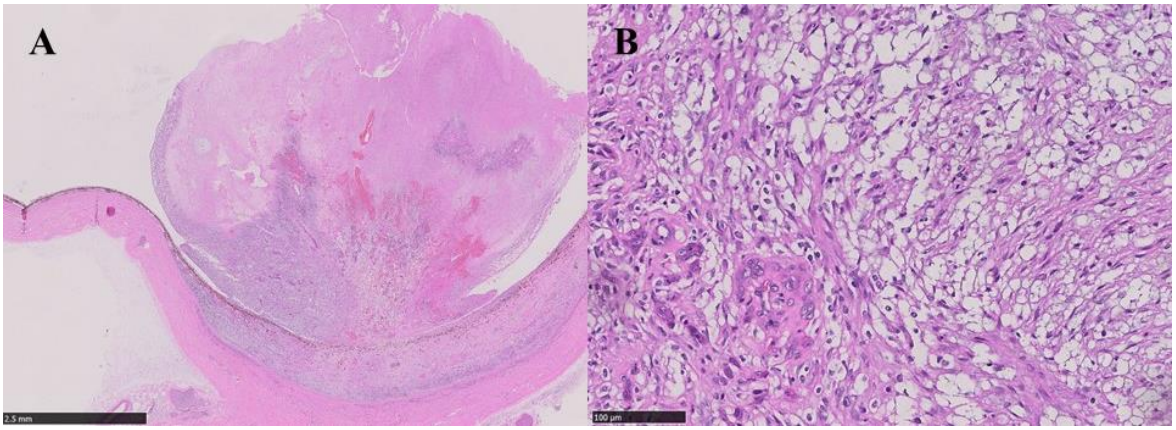


**Figure 2.** Anatomopathological analysis (H&E stain). **A**, Sagittal section of left eye and mass of the optic papilla, with growth into to vitreous chamber. **B**, Optic nerve glioma, with cells ranging from ovoid to spindle-shaped nests and bundles.

The postoperative period evolved without any clinical complications. A 10 days course of oral amoxicillin associated with clavulanic acid (12 mg/kg) every 12 hours, as well meloxicam (0.1 mg/kg) every 24 hours, for eight days and tramadol (2 mg/kg) every 12 hours, for five days. Ten days after the surgical procedure, skin sutures were removed. After enucleation, the dog did not receive any auxiliary treatment and did not present any clinical alteration, until the time being.

## Discussion

Eye gliomas are rare, with an incidence of 0.36% among all canine eye neoplasms (Naranjo et al., 2008). With reports of ocular neuroectodermal neoplasms in humans (Mathew et al., 2016), horse (Eagle Junior et al., 1978), fish (Bartlett et al., 2010), lhama (Fugaro et al., 2005) and in dogs (Naranjo et al., 2008), as in the case presented. He animal related was eight years old and of Portuguese origin, Transmontano Mastiff dog. The mean age of the affected dogs was 9.3 ± 3.7 years, with no predilection for race or gender (Naranjo et al., 2008).

The animal had a history of uveitis, visual loss, diffuse corneal edema, moderate conjunctival hyperemia and secondary glaucoma, with very high measurements of intraocular pressure, considering the parameters for species between 15-25 mmHg (Turner, 2010). Such clinical findings have been reported in dogs with ocular glioma (Labelle & Labelle, 2013; Laus & Oriá, 1999; Maggs et al., 2017). In addition, systemic disorders such as Rickettsia disease can manifest hemorrhagic uveitis (Maggs et al., 2017), the animal performed the treatment for such a disease. Being intraocular hemorrhage, a common finding in animals with Rickettsia and ocular glioma (Maggs et al., 2017).

Ocular ultrasound examination is indicated when there are opacifications of physiologically transparent media (Costa et al., 2014), as the reported case with corneal edema. In the initial ultrasound examination, the presence of extensive hemorrhage in the vitreous chamber was observed. Organized hemorrhage and blood clots can be hyperechoic and have the appearance of masses, which can be mistakenly interpreted as intraocular neoplasms (Costa et al., 2014; Gallhoefer et al., 2013). For such screening, control ultrasound examination was performed, showing a hyperechoic structure in the shape

of a mushroom located in the peripapillary region. In view of clinical changes and ultrasound findings, enucleation was carried out. Enucleation is indicated for blind, painful eyes and when glaucoma secondary to intraocular neoplasia is present (Maggs et al., 2017).

The anatomopathological analysis concluded that it was an optic nerve glioma. The cytological characteristics to categorize the primary diagnosis of glioma, can be based on hypercellularity, pleomorphism, mitosis, vascular proliferation and necrosis (Naranjo et al., 2008). Considering the increase in these criteria, it consequently results in an increase in the degree of classification of the glioma (Naranjo et al., 2008). The low-grade classification has loosely arranged spindle cells arranged in interlaced bundles and fascicles, thin fibrillar cytoplasmic processes, oval to irregular nuclei with dotted chromatin and prominent nuclei unique to multiples and mitotic figures are rarely found (Labelle & Labelle, 2013; Naranjo et al., 2008). Such histological characteristics were observed in the anatomopathological analysis of the case presented.

Gliomas, despite the low potential for metastasis may lead to upward invasion to the ventral part of the brain (Laus & Oriá, 1999; Naranjo et al., 2008). In histological evaluation, no extraocular involvement was observed. After enucleation, follow-up consultations are being carried out, with no clinical changes so far.

## Conclusion

There are rare cases of primary neoplasms that affect the optic nerve. Being the glioma, it should be considered differential diagnosis of intraocular neoplasms. The ultrasound examination should be performed on eyes with opacifications of physiologically transparent means and when intraocular neoplasia suspicion arises. The enucleation surgical performance of this report evolved satisfactorily, presenting a good prognosis for the animal.

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