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CASE REPORT

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Uveal cyst associated with glaucoma in a Shih-tzu

Cisto uveal cursando com glaucoma em Shih-tzu

Catarina Stein Sasso[1], Adriana Torrecilhas Jorge[2], Thaís Gomes Rocha[3], Cristiane dos Santos Honsho[1]*

ABSTRACT: The aim of this report was to describe the diagnosis of uveal cysts in an elderly Shih-Tzu bitch presenting with ocular hypertension that was difficult to control clinically. Uveal cysts can be observed in animals of different species, and their occurrence often goes unnoticed, as they usually do not affect vision. However, in specific cases, they may impair vision by causing ocular opacities and pigmentations, obstructing the visual axis, or interfering with aqueous humor dynamics, leading to glaucoma. Therefore, accurate diagnosis and appropriate therapeutic management are essential to prevent visual complications.

Keywords: dog; iridociliary cyst; ocular hypertension; veterinary ophthalmology.

RESUMO: O objetivo deste trabalho foi relatar o diagnóstico de cistos uveais em uma cadela idosa, da raça Shih-tzu, cursando com hipertensão ocular de difícil controle clínico. Cistos uveais podem ser observados em animais de todas as espécies e sua ocorrência passar despercebida, uma vez que não influenciam a visão. Entretanto, há casos pontuais em que podem alterar a visão ao suscitarem opacidades e pigmentações oculares, ou se interporem no eixo visual, ou de interferirem com a dinâmica do humor aquoso, ocasionando o glaucoma. Dessa forma, o diagnóstico e a terapêutica adequada são importantes para combater as complicações visuais.

Palavras-chave: cão; cisto iridiano; hipertensão ocular; oftalmologia veterinária.

INTRODUCTION

Uveal cysts are fluid-filled structures, translucent or pigmented, spherical or elongated, located free-floating in the anterior chamber, attached to the pupillary margin or corneal endothelium, or within the posterior chamber (Dubielzig *et al*., 2010; Gelatt, 2021; Maggs; Miller; Ofri, 2018). They may be observed in several animal species, but are more frequently described in dogs (Dubielzig *et al*., 2010). Cysts can appear as solitary or multiple lesions, and they may affect one or both eyes (Dubielzig *et al*., 2010; Gelatt, 2021; Maggs; Miller; Ofri, 2018).

They originate from the posterior pigmented epithelium of the iris or from the inner epithelium of the ciliary body, usually presenting with a thin wall, which might be pigmented or not (Dubielzig *et al*., 2010; Gelatt, 2021; Maggs; Miller; Ofri, 2018). They can be congenital or acquired. Congenital cysts arise due to incomplete fusion of the two layers of the primary optic vesicle or entrapment of surface ectoderm, neuroectoderm, and mesodermal tissue during development (Gelatt, 2021), and may remain unnoticed until adulthood (Maggs; Miller; Ofri, 2018). In some breeds, such as Golden Retriever (Corcoran; Koch, 1993; Dubielzig *et al*., 2010; Maggs; Miller; Ofri, 2018), Great Dane (Maggs; Miller; Ofri, 2018), Boston Terrier (Corcoran; Koch, 1993; Maggs; Miller; Ofri, 2018), and Labrador Retriever (Corcoran; Koch, 1993; Dubielzig *et al*., 2010), a recessive hereditary pattern has been reported (Maggs; Miller; Ofri, 2018). Acquired cysts are less common and usually diagnosed in middle-aged to older dogs (Corcoran; Koch, 1993; Delgado *et al*., 2010; Dubielzig *et al*., 2010; Maggs; Miller; Ofri, 2018), most often occurring secondary to ocular trauma or intraocular inflammation (Dubielzig *et al*., 2010; Gelatt, 2021; Maggs; Miller; Ofri, 2018).

They become clinically important when they impair vision by inducing endothelial opacities or pigmentation of the anterior lens capsule, mechanically interfering with iris function, blocking the visual axis, or obstructing aqueous humor drainage, which may lead to ocular hypertension and glaucoma (Deehr; Dubielzig, 1998; Gelatt, 2021; Maggs; Miller; Ofri, 2018).

This report describes a case of uveal cysts associated with clinically refractory ocular hypertension in an elderly Shih-Tzu bitch.

CASE REPORT

An 8-year-old spayed female Shih-Tzu dog, weighing 4.5 kg, was referred for ophthalmic evaluation due to impaired vision, mild buphthalmia, conjunctival hyperemia, and mucoid discharge in the left eye persisting for 20 days. The condition had been treated at home by the owner with a commercial ophthalmic solution containing naphazoline hydrochloride and pheniramine maleate (Claril® – Novartis, São Paulo, Brazil), three times daily, without clinical improvement. The medical history revealed no systemic diseases, and

[1] Graduate Program in Animal Science, Vila Velha University (UVV), Vila Velha/ES, Brazil.
[2] DVM, PhD, Private Practitioner, Franca/São Paulo, Brazil.
[3] School of Agricultural and Veterinary Sciences, Department of Veterinary Clinic and Surgery, São Paulo State University (UNESP), Jaboticabal/SP, Brazil.
*Corresponding author: crishonsho@yahoo.com.br.
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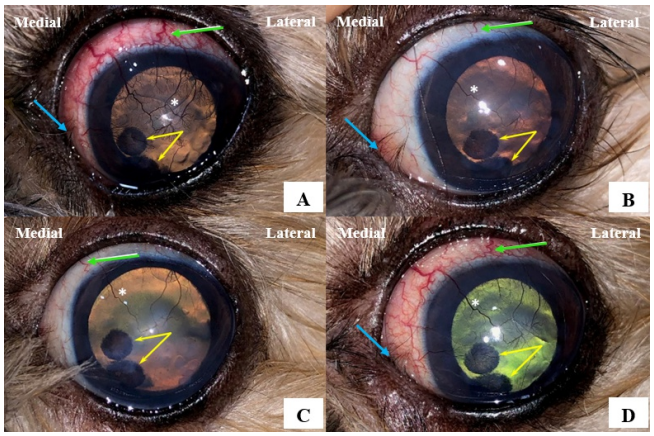
hematological examinations were within reference ranges. The right eye had been surgically enucleated approximately one year earlier due to corneal perforation secondary to progressive ulcerative keratitis. Ophthalmic examination of the left eye showed mild buphthalmia, conjunctival hyperemia, mucoid ocular discharge, episcleral vessel engorgement, corneal neovascularization, caruncular trichiasis, and superior and inferior distichiasis, in addition to the presence of uveal cysts located between the iris and the lens (Figure 1A). Schirmer tear test (Strips Teste Schirmer® – DrogaVet Laboratories, Curitiba, Paraná, Brazil) measured 12 mm/minute. Assessment of visual function revealed decreased direct pupillary light reflex (+), menace response (+), and obstacle course navigation (+). Intraocular pressure (IOP), measured in triplicate by applanation tonometry (Tonometer td-8000® – Apramed Indústria e Comércio de Aparelhos Médicos LTDA, São Carlos, São Paulo, Brazil), was 28/28/29 mmHg.

Figure 1 – Photographs of the left eye of an 8-year-old Shih-Tzu bitch. (A) First clinical evaluation: note conjunctival hyperemia, congested, dilated, and tortuous episcleral vessels (green arrow), corneal neovascularization (*), uveal cysts between the iris and the lens (yellow arrows), and caruncular trichiasis (blue arrow). (B) First follow-up and (C) second follow-up: absence of conjunctival hyperemia, less evident episcleral vessels (green arrow), decreased caliber of corneal vessels (*), persistence of uveal cysts between the iris and the lens (yellow arrows), and caruncular trichiasis (blue arrow). (D) Fourth follow-up: conjunctival hyperemia, congested, dilated, and mildly tortuous episcleral vessels (green arrow), corneal neovascularization (*), persistence of uveal cysts between the iris and the lens (yellow arrows), and caruncular trichiasis (blue arrow).



Source: Personal archive, 2022.

Ocular ultrasonography of the left eye revealed a well-defined globe, with anechoic content in the anterior chamber and vitreous cavity, and a moderate amount of floating hyperechoic material consistent with vitreous degeneration. The lens was in normal position and morphology, with no abnormalities detected in the fundus (retina) or retrobulbar structures. The ocular measurements were as follows: globe diameter 2.02 cm, anterior chamber depth 0.28 cm, and vitreous chamber depth 0.99 cm (Figure 2).

Figure 2 – Ultrasonographic images of the left eye of an 8-year-old Shih-Tzu bitch. (A) Axial scan showing the left globe with well-defined margins, lens poorly visualized, and measurements of the anterior chamber (0.28 cm) and vitreous chamber (0.99 cm). (B) Axial scan showing the left globe with well-defined margins, anechoic content in the anterior and vitreous chambers, moderate floating hyperechoic sediment in the vitreous chamber, and measurement of the globe diameter (2.02 cm, dotted line).

Source: Personal archive, 2022.

Based on the clinical presentation, initial therapy was instituted with topical 1% prednisolone acetate (Ster® – União Química Farmacêutica Nacional SA, Pouso Alegre, Minas Gerais, Brazil) four times daily for 10 days, 1% brinzolamide (Azopt® – Novartis Biociência SA, São Paulo, Brazil) four times daily, and lubricating gel containing 0.2% polyacrylic acid (Adaptis gel® – Legrand Pharma, Campinas, São Paulo, Brazil) four times daily, applied sequentially at 10-minute intervals. After one week of treatment, a reduction in IOP was observed (23/23/22 mmHg), along with decreased conjunctival hyperemia and episcleral congestion, and the initial protocol was maintained (Figure 1B). After 15 days, although hyperemia and episcleral congestion continued to improve (Figure 1C), IOP increased again (28/30/32 mmHg), leading to the addition of 0.5% timolol maleate (NeoQuímica Comércio e Indústria Farmacêutica LTDA, Anápolis, Goiás, Brazil) twice daily. At this stage, both direct pupillary light reflex and menace response were absent. Twenty days later, IOP rose further (37/39/40

mmHg), and timolol therapy was discontinued due to marked ocular discomfort. Treatment was adjusted to 0.004% travoprost (Travatan® – Novartis Biociência SA, São Paulo, Brazil) twice daily, combined with 1% brinzolamide four times daily. After one week, IOP decreased significantly (12/12/13 mmHg), although conjunctival hyperemia and episcleral congestion worsened (Figure 1D). The therapy was maintained; however, after 20 days, the owner reported intense ocular discomfort, tearing, and increased hyperemia and episcleral congestion following a suspected trauma. Fluorescein staining confirmed the presence of a superficial central corneal ulcer measuring approximately 3 mm in diameter. Treatment was supplemented with topical 0.3% tobramycin (Tobrex® – Allergan SA, São Paulo, Brazil) three times daily and 0.35% ethylenediaminetetraacetic acid (EDTA) eye drops (Formula Animal Compounding Pharmacy, São Paulo, Brazil). The owner declined surgical procedures.

DISCUSSIONS

Uveal cysts may be classified as primary (spontaneous, congenital) or secondary (acquired) (Gelatt, 2021). According to Dubielzig *et al*. (2010), primary cysts often affect both eyes. In the present case, the patient had previously undergone enucleation due to corneal perforation following progressive ulcerative keratitis, making it impossible to determine whether cysts were present bilaterally, which would have increased the suspicion of a congenital origin. Furthermore, in Shih-Tzu dogs, uveal cysts are not among the ocular abnormalities commonly observed in the breed (Gough; Thomas, 2010; Maggs; Miller; Ofri, 2018).

On the other hand, acquired uveal cysts are more frequently reported in middle-aged to older dogs (Corcoran; Koch, 1993; Delgado *et al*., 2010; Dubielzig *et al*., 2010; Maggs; Miller; Ofri, 2018), as in this patient. Although cysts may sometimes be suddenly noticed by owners (Delgado *et al*., 2010), in the present case they were only identified during ophthalmic examination. Differentiation between uveal cysts and pigmented intraocular neoplasms, such as melanomas or melanocytomas, is crucial to avoid unnecessary enucleation (Dubielzig *et al*., 2010; Gelatt, 2021; Maggs; Miller; Ofri, 2018). In this respect, the translucent appearance of the cysts (Gelatt, 2021) (Figure 1D) was essential for diagnosis. When such distinction is unclear, ocular ultrasonography may provide valuable information (Gelatt, 2021; Maggs; Miller; Ofri, 2018; Taylor *et al*., 2015). In this patient, however, ultrasonography was not fundamental for cyst detection but was important to exclude intraocular neoplasms and retinal detachment, the latter being relatively common in the species (Gough; Thomas, 2010; Maggs; Miller; Ofri, 2018), as well as to identify vitreous degeneration, which has also been reported in dogs with iridociliary cysts (Spiess *et al*., 1998). For improved visualization of the anterior segment and detailed characterization of iridociliary cysts, the use of higher-frequency probes (>10 MHz, preferably 50 MHz) is recommended (Gelatt, 2021; Spiess *et al*., 1998; Taylor *et al*., 2015), which was not available in this case.

Histopathological studies in glaucomatous dogs have demonstrated the presence of uveal cysts, suggesting their involvement in disease pathogenesis (Deehr; Dubielzig, 1998; Spiess *et al*., 1998). Cysts located in the posterior chamber may displace the iris anteriorly, narrowing the drainage angle and favoring ocular hypertension, particularly when present in large numbers (Maggs; Miller; Ofri, 2018) or of large size, thereby mechanically interfering with iris function, obstructing aqueous humor outflow, and inducing ocular hypertension (Deehr; Dubielzig, 1998; Gelatt, 2021; Spiess *et al.,* 1998). In this patient, ultrasonography did not reveal additional posterior chamber cysts to support this mechanism (Maggs; Miller; Ofri, 2018). Moreover, the clinical history did not suggest inflammatory events as a predisposing factor. According to Gelatt (2021), uveitic cysts are often less pigmented, more translucent, and irregularly shaped, which was not consistent with the cysts observed in this case. Another mechanism of secondary ocular hypertension associated with uveal cysts is pigment dispersion syndrome described in Golden Retrievers, in which pigment granules deposit in the drainage angle and on the anterior lens capsule (Deehr; Dubielzig, 1998; Dubielzig *et al*., 2010; Gelatt, 2021). In such cases, the affected eyes are typically heavily pigmented (Dubielzig *et al.,* 2010), which was not observed in this patient.

The therapeutic approach aimed to control intraocular pressure (IOP), mitigate associated inflammation, prevent visual loss, and promote patient comfort. Initial treatment with 1% brinzolamide, a topical carbonic anhydrase inhibitor, resulted in a modest reduction in IOP, while corticosteroid therapy decreased conjunctival hyperemia and episcleral congestion. At follow-up, 0.5% timolol maleate was added due to its synergistic effect with carbonic anhydrase inhibitors in IOP control (Blacklock *et al*., 2016; Gelatt, 2021). As hypertension persisted and ocular discomfort intensified, 0.004% travoprost, a prostaglandin analog, was introduced, resulting in a marked hypotensive effect. This effect occurs through agonist action on prostaglandin receptors, enhancing aqueous humor drainage via the unconventional uveoscleral pathway (Sagara *et al.,* 1999). A common side effect, conjunctival hyperemia, was observed following its use (Chen *et al*., 2005; Feldman, 2003).

Primary glaucoma is a hereditary disease (Deehr; Dubielzig, 1998; Sapienza, 2008), affecting several breeds including Beagle, Basset Hound, Chihuahua, American Cocker Spaniel, Siberian Husky, Poodle, and Shih-Tzu (Gelatt, 2021; Sapienza, 2008). It results from ocular hypertension secondary to narrowing or closure of the drainage angle and impaired aqueous outflow (Deehr; Dubielzig, 1998; Spiess *et al*., 1998), leading to progressive loss of retinal ganglion cells and optic nerve axons, with consequent visual field and vision loss. Age of onset varies among breeds, typically between four and ten years (Gelatt, 2021). Secondary glaucoma, by contrast, results from pre-existing intraocular or systemic disease (Deehr; Dubielzig, 1998; Spiess *et al*., 1998), which may also act as a trigger for cyst formation (Dubielzig *et al.*, 2010; Maggs; Miller; Ofri, 2018). In the present case, the

limited clinical history did not allow us to determine the exact origin of glaucoma.

CONCLUSIONS

Although the Shih-Tzu breed is not commonly affected by uveal cysts, it is considered predisposed to primary glaucoma. Therefore, it is important that breeds susceptible to primary glaucoma or uveal cysts undergo regular evaluation by a veterinary ophthalmologist, to identify these conditions early and prevent progression to vision loss. Continuous monitoring of affected patients allows timely therapeutic interventions that may preserve vision and improve quality of life.

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