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Management of traumatic unilateral proptosis in Brachycephalic dogs using globe replacement surgery and enucleation

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Abstract
The present study reports two cases of traumatic unilateral proptosis in Shih Tzu dogs of either sex. These dogs were presented to the Department of Veterinary Surgery and Radiology, College of Veterinary Science, Gannavaram. In dog-1, the right eye (OD) was affected, while in the other (dog-2), the left eye (OS) was involved, both resulting from injuries sustained during fights. Comprehensive general and neuro-ophthalmic examinations revealed the absence of reflexes such as the menace response, pupillary light reflex (PLR), and vestibulo-ocular reflex (VOR), with or without intact extraocular muscles. Under general anesthesia, enucleation was performed on the dog-1 with right eye proptosis. For the dog-2 with left eye proptosis, the eye was repositioned, followed by temporary tarsorrhaphy. Postoperative care included both systemic and topical antibiotics and NSAIDs. Both cases showed uneventful recovery during postoperative evaluation.

Keywords: Traumatic, proptosis, Shih Tzu, dog, temporary tarsorrhaphy and enucleation

Introduction
Proptosis is a critical ocular emergency. Traumatic ocular proptosis is characterized by the forward displacement of the eye caused by a traumatic event, often accompanied by the entrapment of the eyelids behind the globe (Fossum, 2013) [3]. Carnivores are more prone to globe prolapse due to their incomplete orbital structure, which increases susceptibility to ocular trauma (Joy *et al*., 2009) [4]. In brachycephalic breeds like Shih Tzus, anatomical and physiological features such as shallow orbits, prominent eyes, physiological buphthalmos, macroblepharon, and lagophthalmos further predispose them to globe proptosis.

Materials and Methods
Two Shih Tzu dogs, aged 3 and 4 years and weighing approximately 5 kg and 4.5 kg respectively, were presented to the Department of Veterinary Surgery and Radiology, College of Veterinary Science, Gannavaram. Both dogs had a history of traumatic proptosis resulting from injuries sustained during a fight. In Dog-1,the right eye (OD) was affected (Fig-1), while in Dog-2, the left eye (OS) was involved (Fig-2).

Fig 1: Right side proptosis eye in Shih Tzu (dog-1).

Fig 2: Shih Tzu presented with proptosis of left eye (dog-2).

A thorough general and neuro-ophthalmic examination revealed notable differences between the cases. In Dog-1, the affected right eye showed complete loss of all reflexes, including menace, pupillary light reflex (PLR), and vestibulo-ocular reflex (VOR). This was accompanied by damage to more than three extraocular muscles. Conversely, Dog-2's affected left eye exhibited an absence of the menace reflex, sluggish PLR and VOR, and minimal extraocular muscle damage. Based on these findings, enucleation was performed for Dog-1 due to extensive damage, while globe replacement with temporary tarsorrhaphy was opted for Dog-2.

Both procedures were carried out under general anesthesia. Premedication included Atropine Sulphate (0.04 mg/kg SC) and Butorphanol (0.2 mg/kg IM). General anesthesia was induced with Midazolam (0.2 mg/kg) and Ketamine (5 mg/kg), and maintenance was achieved using 2% Isoflurane with oxygen supplementation.

Fig 3: 7th day intact sutures after Subconjunctival – Enucleation (dog-1).

Fig 4: Repositioning the globe in its original place then followed by temporary tarsorrhaphy (dog-2).

The proptosed eyes were thoroughly cleansed with a 1:50 diluted povidone-iodine solution. For Dog-1, subconjunctival enucleation (Fig-3) was performed following standard surgical protocols. In Dog-2, the globe was repositioned with the aid of a lubricant (Hicool gel) and secured using temporary tarsorrhaphy with silk no. 0 sutures (Fig-4).

Postoperative care included Ceftriaxone-Tazobactam (25 mg/kg) for one week and Meloxicam (0.2 mg/kg) for three days. Topical Moxifloxacin eye drops and Flurbiprofen eye drops were prescribed (2 drops, three times daily) for two weeks. An Elizabethan collar was used until the sutures were removed (Fig-5). Sutures were removed on Day 11 in both cases.

Fig 5: 11th day after suture removal in Shi Tzu with E-Collar (dog-1).

By Day 15 postoperatively, Dog-2 showed moderate central corneal scarring (Fig-7). Treatment was continued with a topical steroid-antibiotic combination for an additional two weeks. By Day 30, the dog exhibited corneal pigmentation (Fig-8) and minimal peripheral visual acuity recovery.

Fig 6: On 15th postoperative day dog left eye showed a central moderate scar (dog-2).

Fig 7: On 30th postoperative day dog left eye showed a central corneal pigmentation (dog-2).

Results and Discussion

Keratoconunctivitis sicca and optic nerve atrophy are common sequelae of proptosis; however, these complications were not observed in this study over a one-month period. Instead, moderate pigmentation was noted in contrast to previous findings (Stephen, 2008) [9]. Ocular emergencies such as proptosis can be managed through enucleation or tarsorrhaphy, depending on the viability of the extraocular tissues and the eye (Mandell, 2005) [6]. In the present cases, surgical management included tarsorrhaphy without lateral canthotomy in one case in accordance with (Sharma *et al.*, 2021) [1] and enucleation in another.

Favorable prognostic indicators for globe replacement surgery

in brachycephalic dogs with traumatic proptosis—such as vision at initial examination, positive direct or consensual pupillary light response, and absence of posterior segment abnormalities—aligned with the findings of Miller (2013). [7] Proptosis is predominantly seen in brachycephalic dogs, where lagophthalmos and relative globe exposure are common breed traits (Mandell, 2000; Spaulding, 2008) [5,8].
These cases document proptosis in Shih Tzu dogs, a brachycephalic breed. Both dogs recovered completely after two weeks of treatment without complications. However, the repositioned globe in one case exhibited pigmentation.

Conclusion
This study concludes that traumatic proptosis is a critical ocular emergency. When cases are presented early, within 4 hours of injury, the eye can often be repositioned to its original place, depending on the extent of damage and the preservation of reflexes. However, in delayed presentations, enucleation is typically required and is performed using the subconjunctival approach.

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Conflict of Interest
Not available

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