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Salvage Approaches for Maintaining the Eye Globe in a Glaucomatous Patient with Severe Unilateral Exophthalmos

Eunjik Kim, Sungho Yun and Young-Sam Kwon[1]

College of Veterinary Medicine, Kyungpook National University, Daegu 41566, Republic of Korea

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Abstract : An eight-year-old Shih-Tzu dog was referred to Kyungpook National University Veterinary Medical Teaching Hospital because of severe glaucoma and exophthalmos. The symptoms included severe buphthalmos, conjunctival hyperemia, focal dried cornea and discomfort in the affected eye. Although enucleation was considered as a potential intervention measure in light of the severity of symptoms, it was possible to save the globe and relieve symptoms through evisceration, intraocular prosthesis implantation, and lateral canthoplasty. Our experience with this case suggests that symptomatic salvage therapy, rather than enucleation, is an appropriate approach for resolution of exopthalmos and other complications associated with glaucoma surgery.

Key words **:** Exophthalmos, glaucoma, salvage technique.

Introduction

Exophthalmos refers to the forward displacement (or protrusion) of an eye globe from its orbit. The orbit is a confined space surrounded by bones such as the frontal, lacrimal, zygomatic, and sphenoid bones and therefore has no room for expansion or enlargement of its contents; as such, exophthalmos is one of many symptoms of orbital diseases that affect this structure. There may be several reasons for exophthalmoses, most of which are generally categorized into three groups: inflammatory, cystic, and neoplastic orbital diseases. More specifically, conditions such as orbital cellulitis or abscess, masticatory muscle myositis, extraocular polymyositis, orbital neoplasia, as well as a change in neighboring tissue due to glaucoma and mucocele can trigger exophthalmos of the eye globe (2).

In this report, we discuss the findings for an 8-year-old spayed female Shih-Tzu dog that presented with a history of glaucoma and concurrent exophthalmos.

Case

The patient was initially referred to Kyungpook National University Veterinary Medical Teaching Hospital for scleral hyperemia of the right eye. There were no direct pupillary light reflexes in both eyes. However, upon testing, the left pupil contracted to the light stimulation of the right eye. In addition, the right cornea was positively stained with fluorescein, indicating mild ulceration; by contrast, the left eye did not show staining. The intraocular pressure (IOP) of the right eye was 52 mm Hg when tested with Tonovet, while that of the left eye was slightly below the normal range. Palpebral reflex of the right eye was reduced, and menace reflexes were absent on both eyes. In addition, the right eye had a result of 17 mm on the Schirmer tear test, compared to 20 mm for the left eye. Thus, as an emergency intervention for glaucoma, the patient was treated with 1 g/kg of 20% mannitol intravenously, which resulted in a drop in the IOP to 24 mmHg after treatment. The glaucoma was subsequently managed medically with timolol eye drops (Merck Sharp & Dohme Chibret, France) and latanoprost eye drops (Pfizer, Belgium), and the corneal ulceration with ofloxacin eye drop. Prednisolone (0.25 mg/kg, q12h) and antibiotics (amoxicillin 20 mg/kg, q12h) were also prescribed as oral medication for two weeks.

Surprisingly, the glaucoma worsened even with this treatment, and the patient returned two weeks later with an IOP of 87 mmHg. The owner was also concerned about the unilateral buphthalomosis of the right eye (Fig 1). Upon fundus examination with indirect ophthalmoscopy, the retina showed no arteries or veins, and the optic nerve was cupped. Reflex tests indicated that the affected eye was blind. After establishing that the previous medical treatment had not been useful in this case, evisceration and intraocular prosthesis implantation was adapted as a salvage procedure in this case (1).

Preoperatively, ultrasound examination did not reveal abnormal structures or masses inside the eye or around the orbit (Fig 2). After evisceration and intraocular prosthesis implantation, the patient was relieved of the symptoms of glaucoma, but exophthalmoses of the right eye progressed for four months following the operation (Fig 3).

Subsequent ultrasound examination confirmed that the condition was not due to tumors or cystic structures invading the orbital space. Since the patient was prescribed prednisolone for two weeks but showed no improvement of proptosis, inflammatory causes such as extraocular myositis

[1]Corresponding author.
E-mail : kwon@knu.ac.kr

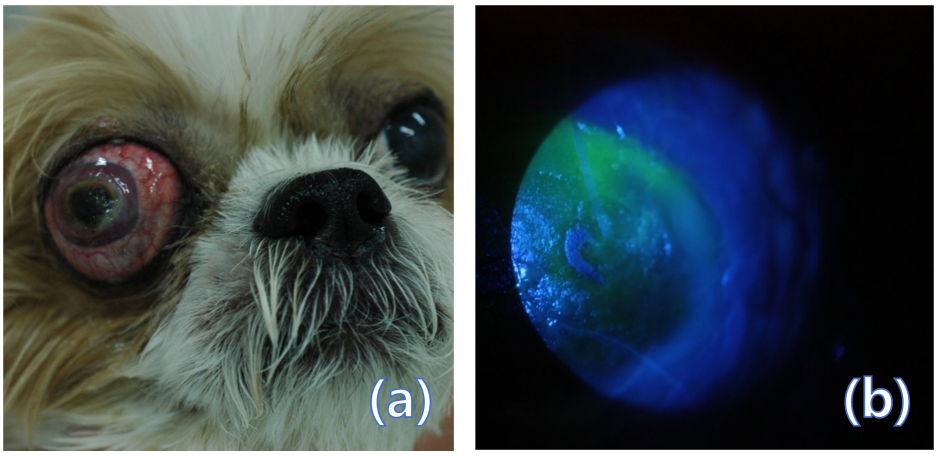

Fig 1. The image of the patient's right eye with severe buphthalmosis (a) and moderate corneal ulceration (b) on the day of the second examination.

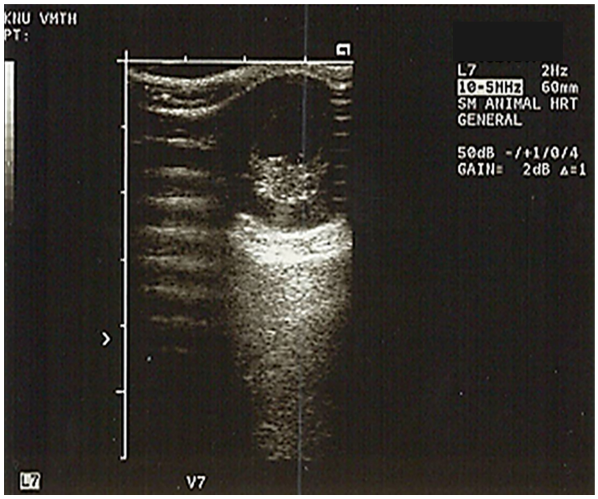

Fig 2. Ultrasonographic image of the patient's right eye. Preoperatively, ultrasound examination revealed neither structures nor masses around the orbit. Inside the globe, we noted hyperechoic, inflammatory changes in the vitreous humor.

were also ruled out. Consequently, it was suspected that the exophthalmoses could have been related to glaucoma when it first occurred, but then progressed in an idiopathic fashion. Thus, the treatment of choice was lateral tarsorrhaphy. As a prophylactic measure, lateral canthoplasty was also performed for the contralateral eye (Fig 3).

Discussion

A lateral canthoplasty, or tarsorrhaphy, is required when the interpalpebral fissure must be decreased, because an abnormal eyelid position and function can cause serious damage to corneal integrity. This lid-shortening procedure may also be necessary in some cases of exophthalmos on a temporary or permanent basis (5). The goal of such a procedure would be to reduce corneal exposure, improve functional blinking, and reduce the likelihood of traumatic proptosis (3).

Traditionally, when complications follow after glaucoma surgery, the blind globes would be enucleated to relieve the problems. However, as seen in the case presented here, the progressive proptosis and moderate corneal damage that arose after surgical treatment of glaucoma were successfully corrected through lateral tarsorrhaphy. Since owners tend not to prefer enucleation for aesthetic reasons, evisceration and intraocular prosthesis implantation have emerged as alternative choices for salvaging the eye (4,6). In accordance with this trend and in the interest of saving the globe as much as

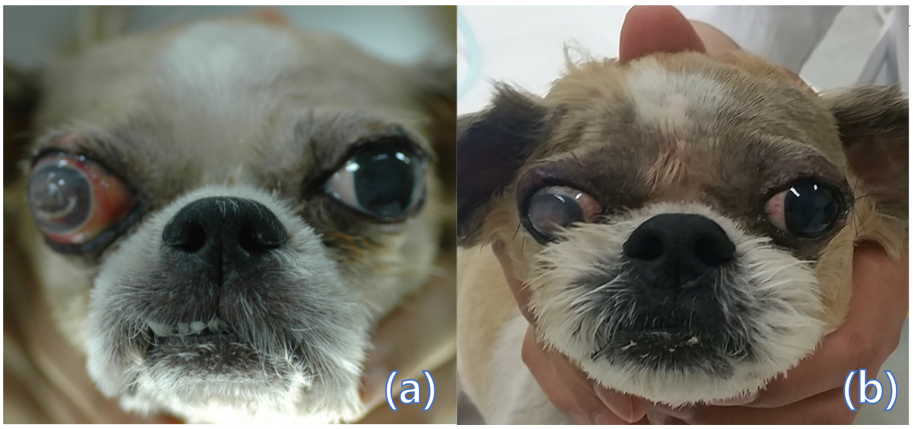

Fig 3. The patient after evisceration and intraocular prosthesis implantation. There was severe exophthalmos even with the surgery (a), and it progressed through a 4-month period. With bilateral lateral canthoplasty, the exophthalmos was also treated (b).

possible, the treatment regimen was set to lateral canthoplasty for severe proptosis rather than enucleation.

Conclusion

Given that the owner was highly satisfied with the result of the treatment, it was concluded that a salvage procedure combined with symptomatic therapy-rather than complete removal of the globe-may be appropriate for resolving complications associated with glaucoma surgery. However, further studies with a large number of similar cases of glaucoma and exophthalmos must be conducted in order to confirm the efficacy of this course of therapy.

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