



# Congenital Glaucoma in Two Cats and Surgical Repair with Trabeculectomy

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## Abstract

This current work aims to assess the efficacy and tolerability of trabeculectomy procedure for the management of congenital glaucoma in two cats. Filtration surgery was performed using a limbus-based approach, and flap was raised smoothly to nearly limbus on sclera. Sclera-corneal trabecular block was removed both with surgical knife and microsurgery scissors. Successful result was defined as resolution of leakage with no need for additional surgery, together with maintaining intraocular pressure in the range of 5-21 mmHg with anti-glaucoma medications. In conclusion, trabeculectomy decreased intraocular pressure in cats with congenital glaucoma, there for it may proposed for treatment of related disease.

## Introduction

Glaucoma is the one of the leading cause of irreversible visual impairment that affects wide population of pet animals. In kittens and puppies, congenital glaucoma is usually secondary to malformation of the iridocorneal angle and/or dysgenesis of the structures of the anterior segment (Amelinckx et al., 2009). The eyes of young animals tend to enlarge more rapidly and more severely when glaucoma was present (Amelinckx et al., 2009; Samuelson and Brooks, 2006). Glaucoma treatments are directed at reducing intraocular pressure (IOP), either pharmacologically or surgically. Surgery is performed when medication and laser treatment failed to control IOP (Wang et al., 2013).

This current work aims to assess the efficacy and tolerability of trabeculectomy procedure for the management of congenital glaucoma in two cats.

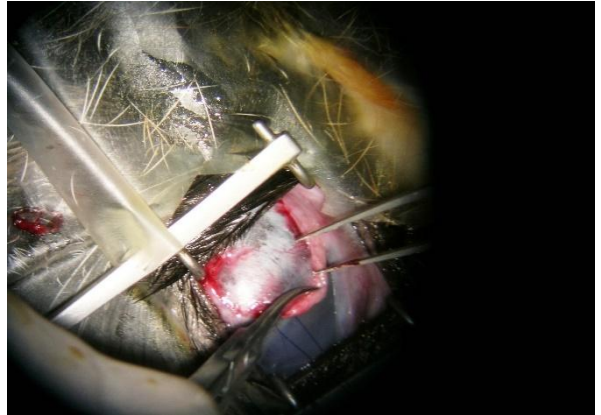
## Case

Two domestic short hair cats (*Felix domesticus*), 4 month of age, one is male and other is female, and both of them weight 1.5 kg were referred to our clinics. They were siblings. The owner realized that the cats had poor visual acuity with an opaque stain in their both eyes for 1 month. On ophthalmological examination, the eyes

were seen enlarged and were asymmetrical; the left eye was larger than the right in case 1 (Figure 1). Right eye was perforated and occurred iris staphyloma and left eye was enlarged in case 2 (Figure 2). There were bilateral conjunctival redness, congestion of the episcleral vessels and bilateral pupillary dilatation in both cases. Both the direct and indirect pupillary light reflexes and the menace response were absent. Tapetum lucidum was visible by ophthalmoscopy in both eyes in case 1 and in right eye in case 2. After application of 0.5% proparacaine hydrochloride Intraocular pressures were estimated with a TonoPen (Reichert, USA), and found >40 mmHg (mean IOP: 20.74 mmHg) preoperatively in right and left eyes in case 1 and in right eye in case 2.

Trabeculectomy procedure was performed under general anesthesia with intramuscular injection of ketamine hydrochloride 20 mg/kg, xylazine 2 mg/kg, atropin sulfate 0.02 mg/kg, and topical anesthesia was achieved with proparacaine eye drops. Patients were intubated endotracheally. Eye was covered up by eye drape and irrigated by diluted povidone solution. A partial-thickness 8/0 silk corneal traction suture was placed at 12 o'clock and the eye pulled down, to gain exposure to the superior conjunctiva. Upper bulbar conjunctiva was dissected from limbus and sclera was

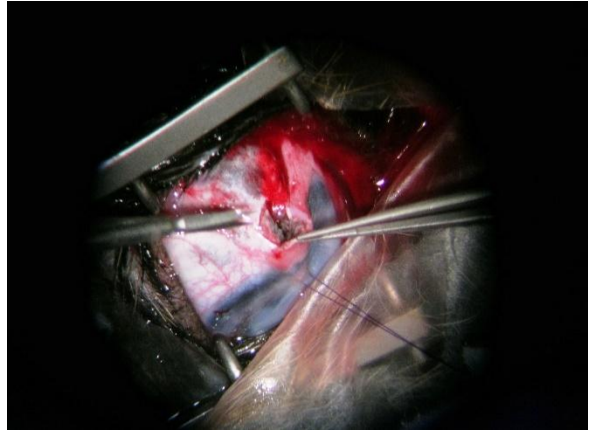
exposed (Figure 3). Mitomisin-C (MMC) was applied 0.2 mg/ml during 1.5 min to sclera and thoroughly irrigated. Filtration surgery was performed using a limbus-based approach, and 4×4 mm flap was raised smoothly to nearly limbus on sclera. Sclero-corneal trabecular block was removed with surgical knife and microsurgery scissors (Figure 4). The scleral flap was sutured with additional interrupted 10/0 nylon suture (Figure 5). The conjunctival incision was closed with 2 interrupted sutures and a central mattress-type 8/0 vicryl suture on a needle to give a water-tight closure. One drop of dexamethasone 0.5%, combination of travoprost and timolol, and gentamycine 1% were instilled at the end of surgery. No other adjunctive treatment was given at the time of surgery. Additionally, these drops were administered topically during 5 days.



**Figure 3.** View of dissection of bulbar conjunctiva in case 2.



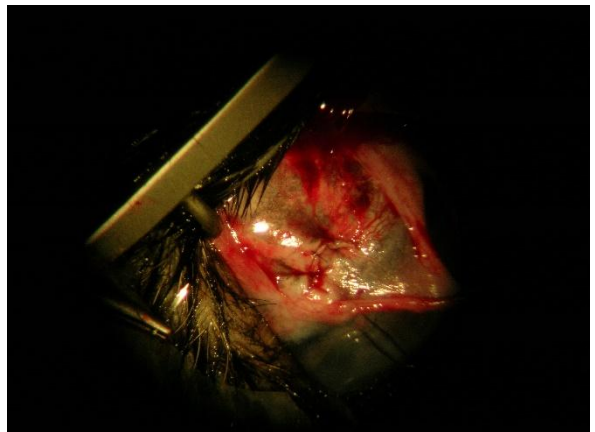
**Figure 1.** View of bilateral buphthalmos in case 1. Noted the enlargement and assymetry in left eye.



**Figure 4.** View of flap raised for sclera and trabecular block removed in case 2.



**Figure 2.** View of buphthalmos in right eye and iris staphylom in left eye in case 2.



**Figure 5.** Application of suture to sclera in case 2.

IOP measurements were performed before and after trabeculectomy procedure. After topical instillation of 0.5% proparacaine hydrochloride eye drops, 1 drop per eye, with a mean reading of three recordings were documented per time point. The cats were assessed on postoperative days 1, 3 and 7. Slightly hyphema was determined in postoperative period of case 1. The conjunctival appearance and the drainage area were observed. In the treated eyes, a small region of avascularity which is a transient finding, was noted in the nasal side of the bleb (<3 mm) within the first 3 days. A bleb was visible in surgically treated eye throughout the first 7 days after trabeculectomy. Over the next 7 days the anterior chamber gradually deepened.

Operation area was associated with elevated, diffuse, fleshy looking blebs compared with the flat one. Local reaction was evaluated by the degree of anterior chamber inflammation and conjunctival vascularity. Bleb vascularity was assessed as vascular or avascular.

Trabeculectomy procedure was uneventful and neither discomfort nor inflammation was observed in cats during the 30 days of postoperative follow-up. Ocular hypertension was not observed during the same time. The cornea, iris, lens, vitreous and retina remained normal and stable. The post-surgery IOP values with a TonoPen were <30 mmHg. The IOPs at postoperative day 30 were <20 mmHg. Visual function of both cats was good and no macroscopic anomaly was determined on eyes.

### Discussion

Conservative treatment with medical agents or with a variety of mechanical methods tried first to cure congenital glaucoma (Melo et al., 2012; Tomlinson et al., 1987). However, this technique is still associated with a significant rate of postoperative complications, including early hypotony, choroidal detachment, hypotonic maculopathy, endophthalmitis, along with others, which has prompted calls for a better and safer operation (Samuelson and Brooks, 2006; Wang et al., 2013).

The trabeculectomy requires the creation of an iridectomy, which is commonly performed, possibly resulting in greater inflammation and an increased likelihood of hyphema with latter produce (Wang et al., 2013). In this case, slightly hyphema was seen in case 1. IOP values were determined between normal values on postoperative day 30.

Conjunctival wound healing after glaucoma filtration surgery is a major determinant of the long term clinical success of the procedure. Failure of glaucoma filtration surgery is the most often due to scarring in the conjunctiva level at the bleb and sclerostomy sites. Information from previous investigations in animal models have helped to formulate a general model of

conjunctival scarring (Angella et al., 2000). A unique aspect of glaucoma filtration surgery healing is the bathing of wound tissues by aqueous humor. No problem was viewed about IOP 1 month after the surgery in cats. Anterior chamber depth was included in the observations as an indirect indicator of the drainage of fluid through the tube into the subconjunctival space. In this case, the anterior chamber was flat on postoperative day 1 and gradually deepened over the next 7 days.

Experience has shown that intraocular pressure is not a reliable indicator of filtration surgery (Mead et al., 2003). Furthermore, in this case IOP was detected below normal limits in postoperative period. The decrease in IOP after trabeculectomy is attributed to increased aqueous outflow through the outflow facility of the anterior chamber aqueous (Amelinckx et al., 2009). There was not determined any decreased in IOP after postoperative period.

In conclusion, trabeculectomy method with raised scleral flap decreased intraocular pressure in cats with congenital glaucoma and may proposed for treatment of congenital glaucoma.

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