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Short Communication

MANAGEMENT OF OCULAR AFFECTIONS IN 64 DOGS

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ABSTRACT: In the present study, brachycephalic dogs accounted for the maximum number of ocular cases. The medical and surgical management techniques showed positive outcomes for various eye affections. Superficial corneal ulcers were treated effectively with topical antibiotics, artificial tear replacers, NSAIDs, and cycloplegic drugs, whereas deep corneal ulcers can be managed by surgical intervention using a third eyelid flap technique and tarsorrhaphy. Treatment of cherry eye can be done by Morgan's pocket technique to avoid postoperative keratoconjunctivitis sicca. Corneal opacity was managed with topical NSAIDs, antibiotics, corticosteroid eye drops, whereas corneal edema cases successfully recovered with topical hyperosmotic agents, antibiotics, and steroidal anti-inflammatory drugs. Corneal melanosis cases were managed by topical instillation of fortified 3% cyclosporine in corn oil and artificial tear replacers.

Keywords: Cherry eye, Corneal ulcer, Eye affections, Morgan pocket technique, Traumatic proptosis.

Ocular disorders have a significant role in small and companion animal practice, as it is one of the most important sense organs. Eye is a very sensitive organ, the function of which may be affected even with mild insult to its homeostasis [1, 2]. Studies on ocular illnesses give details on the frequency of eye disorders, potential diagnoses, and available treatments [1]. Also, the correct instrument selection relies on the ocular conditions that are prevalent among dogs [3]. For initiation of proper line of treatment for eye affection, proper diagnosis of the disease condition is prerequisite. In addition, the management of ocular diseases requires removal of the fundamental cause (if possible), reducing inflammation, controlling infection and enhancing healing. The present study was therefore planned to study the incidence of various ocular affections along with the diagnosis and management.

The Study

The present study was a clinical research and client-owned dogs presented to the college clinic for the treatment of various eye affections in dogs were taken as subject of the study. A written and signed consent was obtained from the owner of each animal before conducting any diagnostic as well as surgical procedure.

Anamnesis of the case regarding age, breed, sex of the animal, eye affected, part of eye affected, cause of the ocular affections, duration of disease and primary treatment given if any, were recorded. The onset of blindness (sudden/gradual), and length of visual loss, (if any) all were documented. In addition, facts about general health, additional indicators of concomitant disease, and previous therapy were documented, if any. Various ocular affections were managed by different therapeutic and surgical procedures as per the diagnosis of the case and as per the facilities available. In case of surgical interventions, the owners were advised to fast the dog overnight before the surgery. Analgesics (Meloxicam @ 0.2 mg/kg BW) and antibiotics (Amoxicillin sodium and sulbactam sodium @ 12 mg/kg BW) were administered intramuscularly 30 minutes preoperatively. The dogs were pre-anesthetized and maintained with a combination of medications including glycopyrrolate (0.01 mg/kg BW, IM), Xylazine (2.0 mg/kg BW, IM), and Ketamine-HCl (5-10 mg/kg BW, IV) to induce the general anaesthesia and maintenance of anaesthesia was done by one third of the induction dose, if required. Postoperatively, antibiotic and analgesics were administered in the prescribed doses, and sutures were removed 10th to 12th day post-operatively. In addition, application of E-collar was recommended for each animal.

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Globe

A total of five cases of traumatic proptosis of the globe were managed, out of which enucleation was done in two cases (Fig. 1) and remaining three cases of traumatic proptosis were managed with tarsorrhaphy.

Enucleation: After completion of draping around the palpebral fissure, a 5–10 mm lateral canthotomy was performed. The bulbar conjunctiva and Tenon's capsule were incised at the 12 o'clock position by Metzenbaum scissors with blunt tips for about 3–5 mm posterior to the limbus, and the incision was extended for 360°. The globe was carefully removed from the orbit, and a ligature was placed deep to the clamped haemostat on the optic nerve and accompanying blood vessels. Finally, both eyelids were sutured together using suture material polyglactin 910 in an intradermal suture pattern followed by tarsorrhaphy.

Temporary tarsorrhaphy: Three other case of temporary tarsorrhaphy was done with usually one or two interrupted horizontal mattress sutures with stents (placed at one-half thickness of the eyelids) under general anaesthesia. Additionally, topical medication was prescribed, (drop- Gentamicin, applied 1-2 QID for 7 days, and Drop-Flurbiprofen, applied 1-2 drops QID for 7 days and artificial tears QID for 15 days.)

Eyelids

Two cases of entropion and one case of blepharitis were recorded. However, owner refused for treatment of entropion and the case of blepharitis was managed by application of topical (Gentamicin and Dexamethasone) along with a systemic antibiotic and analgesics.

2.1 Third eyelid: All the cases of affections of the third eyelid included cases of the cherry eye. A total of 8 cases of cherry eyes were presented (5 cases were bilateral and 3 cases were unilateral, a total of 13 eyes).

The freshly presented case of prolapse of 3rd eyelid gland in 5 animals (total 10 eyes), were repositioned by Morgan pocket technique (Fig. 2)**.** The dogs were prepped for surgery using the conventional periorbital preoperative preparation procedures. The third eyelid was everted and exteriorized to reveal its bulbar surface. Two superficial curvilinear incisions parallel to the free margin on the bulbar side of the third eyelid were made on each side of the prolapsed gland. The gland was inserted into the pocket, and the conjunctival margins were closed using 4-0 polyglactin 910 sutures.

In remaining three cases of cherry eye were operated earlier at another place and were referred for the recurrence of the prolapse of the harderian gland. These cases were managed by excision technique after applying a series of the horizontal mattress sutures at the base of the affected gland followed by removal of the prolapsed part (Fig. 3).

All the patients treated for the cherry eye were prescribed, topically with eye drop antibiotic gentamicin and analgesic flurbiprofen for 7 days. In addition, animals with surgical removal of harderian glands were given artificial tear drops for 3 months and advised for regular STT test.

Conjunctiva

Conjunctivitis: All the cases of conjunctivitis were treated by topical instillation of antibiotic-steroid combination (Gentamicin and Dexamethasone (0.3and 0.1%) eye drop) @ QID for 5 days.

Dermoid: In cases of dermoid, the owners were advised for the surgical removal but they did not opted for surgery.

Cornea

a) Corneal ulcer / Ulcerative keratitis

Medicinal treatment of superficial corneal ulcer cases was treated by topical instillation of artificial tear replacers (Carboxymethylcellulose drops), NSAIDs (Flurbiprofen), cycloplegics (Atropine) and antibiotics (Gentamicin) four times daily for a week. Autologous serum was added to the above treatment protocol, if the ulcer showed no improvement/healing in a week. The cases with deep corneal ulcer underwent surgical management using the third eyelid flap technique under general anaesthesia (Fig. 4).

Third eyelid flap technique: This procedure was done under general anaesthesia and involved the use of 2-0 polyamide sutures to secure the third eyelid to the dorsolateral region of the upper eyelid with the help of a plastic stent. Temporary tarsorrhaphy was also done keeping a small vent kept for regular inspection and administration of eye medications. Post-operative care included the topical application of autologous serum, artificial tears, antibiotics, cycloplegics, and anti-inflammatory drugs as recommended.

b) Descemetocele

The cases of descemetocele were surgically managed using third eyelid flap technique, with the same line of treatment as that of the deep corneal ulcers.

c) Keratoconjunctivitis sicca

A case of Keratoconjunctivitis Sicca was recorded and diagnosed with the Schirmer tear test, which was medically managed using natural tear stimulants

(Cyclosporine eye drops), artificial tear replacers gel (Gel eye drops, Genteal[R]), antibiotics (Gentamicin), autologous serum, and corticosteroid eye drop topically.

d) Corneal opacity

Corneal opacity was treated with a topical antibiotic four times daily, as well as topical corticosteroid (prednisolone 1%) at every six hours intervals. In some cases, melanosis was observed with corneal opacity where cyclosporine (1% or 3%) was used in addition to the above treatment.

e) Corneal oedema

This problem was treated with a topical application of Sodium Chloride (5% w/v) solution (Hypersol[R] Ophthalmic Solution) thrice daily for a week, then reduced gradually, based on the response for the following weeks, coupled with two times daily topical antibiotic, artificial tear, and steroidal anti-inflammatory drops.

f) Pigmentary keratitis / Melanosis

The cases were managed using 3% Cyclosporine fortified with corn oil, four times daily. In addition, antibiotic, non-steroidal anti-inflammatory, and autologous serum was applied four times daily. All the cases were reviewed once in every week for a month**.**

Results and Discussion

The highest number of cases occurred in dogs aged 0-1 year (31.25%) followed by 2-5 years (26.57%) and >5 years (25%) and only 17.18% of cases were in dogs aged 1-2 years.

Breed-wise Pugs had the highest number of cases (23.43%), followed by Beagles (18.75%) and Shih Tzus (15.62%). Other breeds with fewer cases include Labradors (10.93%), Pomeranians (3.13%), and a few rare breeds like Dobermans, Golden Retrievers, and American Bullies, each with only 1 case (1.57%). Brachycephalic dogs accounted for the maximum number of cases (more than half) with Pugs exhibiting the highest incidence of ocular affections (23.43%), followed by Shihtzu.

Most of the affected dogs were male (71.87%), while females made up a smaller percentage (28.13%). Also, a slightly higher percentage of cases affected the left eye (OS) at 53.40%, compared to the right eye (OD), which accounted for 46.60%.

Among different part of the eyes, the most affected part was the Cornea & Sclera, with 37 cases (57.81%). The third eyelid had 8 cases (12.50%), all of which were cherry eyes. The globe (traumatic proptosis, 5 cases and eye tumour, 1 case and enophthalmos, 1 case) and conjunctiva both had 7 cases (10.94% each). The eyelid had the fewest cases (n=3, 4.69%), with 2 entropion and 1 blepharitis.

Globe

The incomplete orbit structure may contribute to the increased vulnerability of the eye to displacement or protrusion in dogs [4]. Besides, the unique anatomical features of brachycephalic breeds, including their large eyes and small orbits, make them more susceptible to globe prolapse even with minimal force [5, 6]. Total five cases of traumatic proptosis were managed, out of these in two cases enucleation was done and three cases were managed with tarsorrhaphy. In one case of enophthalmos the owner was advised to apply topical antibiotics and tear replacers. In the eye tumor case, the owner insisted on euthanizing the dog and poor prognosis of the condition, no more therapy was offered to the animal. As a result, with the owner's permission, the dog was euthanized ethically.

Enucleation: The recommended treatment for severe trauma involving the eye with a torn optic nerve or minimal attachment of the eyeball to surrounding tissue is enucleation followed by permanent tarsorrhaphy [7] and was done in the 02 eyes in the present study, after thorough examination of the affected eyes. The proptosed globe was removed surgically (enucleation) in both the cases. The sutures were removed after the 15th post-operative day.

Temporary Tarsorrhaphy: In this study, the repositioning of the eyeball was performed in 3 cases after gently cleaning the globe with saline-soaked gauze. This was followed by temporary tarsorrhaphy, a method that has also been reported in earlier studies [8]; however, the eyes receded in the socket without lateral canthotomy in the present study. An antibiotic eye ointment was applied between the globe and palpebrae before reposition followed by subconjunctival injection of antibiotic steroid combination. Post-operatively antibiotics and NSAIDs were administered systemically and topically for 7 days. The sutures were removed after the 14th postoperative day. All cases were recovered but redness was observed in two cases on cornea and sclera.

Eyelids

Entropion was observed in two cases but the owner declined to proceed with further treatment. The case of blepharitis was medically managed by topical application of antibiotic-steroid ointment together with

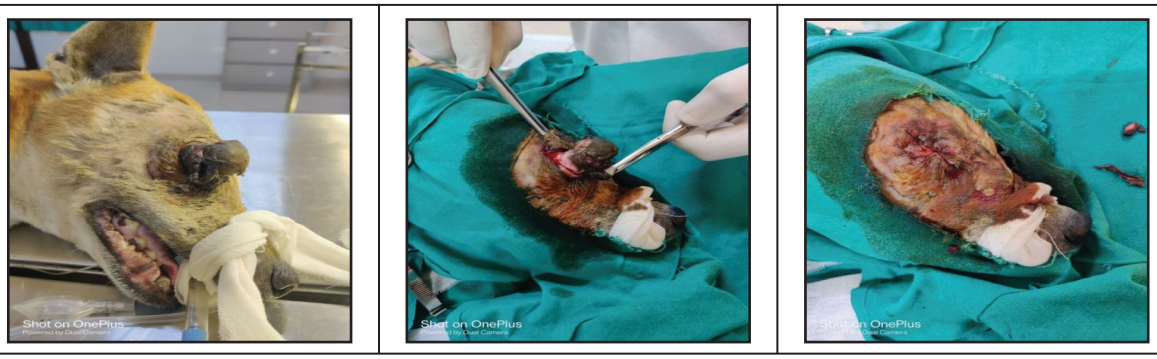

Fig. 1. (a) Preoperative photograph of a dog with traumatic proptosis (b) Enucleation of the affected eye. (c) Postoperative appearance after enucleation.

Fig. 2. (a) Preoperative photograph showing cherry eye in a dog (b) Surgical correction using the Morgan pocket technique.(c) Immediate postoperative.

Fig. 3. (a) Preoperative photograph showing cherry eye in a Beagle. (b) Surgical excision of the third eyelid gland (c) Postoperative recovery on 12th day.

Fig. 4. (a) Deep corneal ulcer (b) Third eyelid flap in position (c) Day 35: Healed cornea.

systemic antibiotic, antihistamines and analgesics in the prescribed doses for 5 days, recovered within 14 days.

Third eyelid gland

Cherry eye was the second most common eye affection noted in the present study and was managed surgically. It was observed with specific clinical symptoms in all cases, including a swollen and protruded gland of the third eyelid, epiphora (excessive tearing), tear staining at the medial canthus, and one case with bleeding from the prolapsed gland due to self-mutilation. Repositioning by Morgan's pocket technique was done in five eyes and excision technique in the remaining three cases for cherry eye removal. Post-operatively topical antibiotic and artificial tear replacers were advised to instill in all the cases. Two cases that were managed by excision technique were later diagnosed with reduced STT values, suggestive of keratoconjunctivitis sicca which was then managed with artificial tear replacers for further two months as also suggested by Gelatt [9]. All other cases showed uneventful recovery

Conjunctiva

Conjunctivitis: Clinical symptoms in all the eyes with conjunctivitis were conjunctival hyperemia, epiphora. Topical instillation of antibiotic; anti-inflammatory followed by gentle cleaning of the eye with cold water. All cases showed uneventful recovery within 7-14 days. In an earlier study conducted [10], the combination of broad-spectrum antibiotics and steroids topically administered showed positive results in treating conjunctivitis as also used in the present study.

Dermoid: In both the cases of dermoid, owners were advised for the surgical removal but they did not want any surgery.

Cornea

In the study, the most common corneal affections were corneal ulcer, corneal opacity, and melanosis, each affecting 9 dogs (25.72%). Corneal oedema was seen in 5 dogs (14.29%), while descemetocele appeared in 2 dogs (5.72%). The least common condition was KCS, which was found in just 1 dog (2.85%).

Corneal ulcer / Ulcerative keratitis

In the present study, the animals were treated medically combined with surgical treatment. Usually superficial and simple corneal ulcers are managed by topical ocular drugs. However complicated ulcers are basically subjected to surgical management. Clinical symptoms of 9 eyes with ulcers were peripheral corneal opacity, uveitis in 04 cases in addition to conjunctival hyperemia, blepharospasm and epiphora and tested positive for Fluorescein stain test (FST).

Out of 9 cases of corneal ulcer 3 cases were superficial ulcers and healed with topical antibiotic, artificial tear replacers, NSAIDs and cycloplegic drug. Improvement observed within 7 days of presentation, with full recovery in 2 to 3 weeks.

Two cases with no or less improvement with the above therapy in 7 to 10 days were given autologous serum in addition, after 10 days of above treatment. In addition, tarsorrhaphy was done with a small vent open for timely inspection and instillation of medications to the eye. All the animals were reexamined on the 10^{th} day after removal of suture. Post-operatively, topical and systemic antibiotic and NSAIDS and also topical artificial tear and cycloplegics eye drop were administered.

The other 4 eyes with deep ulcers were managed by fixing third eyelid flap (nictating membrane flap), under general anesthesia in this procedure, small vent open for timely inspection and instillation of medications to the eye. Post-operatively, topical instillation of autologous serum, NSAIDs, antibiotic and cycloplegics were advised. All the animals were re-examined on the 12^{th} postoperative day after removal of the third eyelid flap. Topical instillation of steroids or 3% cyclosporine with corn oil was advised after two consecutive negative FST staining at weekly intervals. All four cases showed uneventful recovery; some cases show scar / opacity on cornea.

All the cases showed uneventful recovery from 7 to 45 days. However, if KCS is diagnosed along with ulcer, then prolonged treatment is recommended [11], thus regular STT examination of the cases was done.

For surgical treatment of deep corneal ulcer temporary tarsorrhaphy, third eyelid flap keratotomy and conjunctival flap technique are routinely used feasible surgical procedures [12, 13].

Descemetocele

Two cases (5.72%) of descemetocele with a history of penetrating wound were found in a Shih Tzu and Lhasa Apso both within the age group of 0-1 years. Clinical signs observed were thick ocular discharge with apparent prolapse of the descemet's layer from the ulcerated cornea about its center, which appeared as a black hole surrounded by a circular margin of dye on fluorescein staining. Third eyelid flap along with tarsorrhaphy was done under general anesthesia.

Post-operatively topical and systemic antibiotics, NSAIDs together with autologous serum and artificial tear replacers were advised. Both cases recovered uneventfully over a period of 90 to 120 days.

The third eyelid flap helped to protect the cornea and promote healing, while tarsorrhaphy involved joining the upper and lower eyelids partially or completely to provide additional support and maintain the eye in a closed position. Studies have reported that most of the descemetoceles could be repaired successfully using conjunctival grafts or third eyelid flaps [14, 15, 16].

Keratoconjunctivitis sicca (KCS)

It was observed in one (2.85%) female Beagle (2 years age) with a history of thick ropy mucopurulent discharge, dry lusterless cornea with white scar/opacity on right eye and reduced STT readings in one eye <5 mm/min (OD). This case was treated topically with natural tear stimulant (Cyclosporin), artificial tear replacers, antibiotic, and non-steroidal anti-inflammatory drugs. This animal recovered uneventfully and owners were advised for lifelong instillation of artificial tear replacers with regular eye checkup.

Corneal opacity

The corneal transparency and clarity rely on the special organization of the cornea's constituent components wherein even minimal insult to it often results in fibrosis, which may cause significant visual impairment [17]. Corneal opacity is a result of inflammatory exudates due to leucocytes and having three stages nebula, macula and leukoma based on their severity [18]. Topical corticosteroids with antibiotics are helpful but opacities are known to regress within a few months without any treatment. Clinical signs in the affected eyes of five cases mainly included epiphora, while four cases showed whitish discoloration of the corneal surface (Total 09 cases). Schirmer's tear test and fluorescein staining were normal in all the cases. The cases were successfully managed with medical treatment includes topical antibiotic-steroid drops and tear replacers.

Corneal oedema

Clinical examination of eyes revealed softened appearance of the cornea, circumscribed bluish discoloration. Treatment for all seven cases of corneal oedema involved the use of topical hyperosmotic agents, antibiotics, and steroidal anti-inflammatory drugs. The cases showed uneventful recovery within 14-21 days. An earlier study reported that topical hyperosmotic agents are indicated for the management of corneal edema and in compliance with hydroxymethyl cellulose gives a soothing effect [19].

Pigmentary keratitis / Melanosis

Clinical signs in cases of melanosis observed were pigmentation over cornea, and superficial vascularization. Corneal melanosis cases were medically managed by topical instillation 3% cyclosporine, and artificial tear replacer. All the cases with melanosis showed progressive decrease in the pigmentation after 21 days therapy on which, owners were advised for at least 6 month or longer, installation of 3% cyclosporine with artificial tear replacer to prevent further spread of the pigmentation. depending upon the response of the particular case. The treatment of melanosis should focus on slowing the spread of pigmentation and addressing the underlying cause (for example, correction of entropion or ectropion, removal of atypical lashes and aberrant dermis, and potential partial removal of nasal folds) [20]. Topical corticosteroids (e.g., dexamethasone and cyclosporine) are frequently used in treatment of pigmentary keratitis. Other studies have also reported medical management of corneal melanosis by topical instillation 3% cyclosporine fortified corn oil, antibiotic and artificial tear replacer. In some earlier studies, corneal melanosis with ulceration was successfully managed by autologous serum along with above-mentioned therapy [16, 21].

CONCLUSION

Brachycephalic dogs accounted for the maximum number of cases with cornea being the most affected part, followed by the third eyelid. Superficial corneal lesions can be managed medically, whereas deep corneal ulcers need surgical intervention. Treatment of cherry eye can be done by Morgan's pocket technique to avoid postoperative keratoconjunctivitis sicca. Corneal conditions like corneal opacity, corneal edema and corneal melanosis can be successfully managed by proper medicinal treatment.

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