www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(5): 3799-3802

www.thepharmajournal.com
Received: 09-03-2023
Accepted: 16-04-2023

Bhumika Kesanur
Department of Veterinary Surgery and Radiology, Veterinary College Hebbal, KVAFSU, Bengaluru, Karnataka, India

KM Srinivasa Murthy
Department of Veterinary Surgery and Radiology, Veterinary College Hebbal, KVAFSU, Bengaluru, Karnataka, India

BN Nagaraja
Department of Veterinary Surgery and Radiology, Veterinary College Hebbal, KVAFSU, Bengaluru, Karnataka, India

V Mahesh
Department of Veterinary Surgery and Radiology, Veterinary College Hebbal, KVAFSU, Bengaluru, Karnataka, India

Manjunatha K
Department of Veterinary Anatomy, Veterinary College Hebbal, KVAFSU, Bengaluru, Karnataka, India

Corresponding Author:
Bhumika Kesanur
Department of Veterinary Surgery and Radiology, Veterinary College Hebbal, KVAFSU, Bengaluru, Karnataka, India

Treatment of corneal ulcer with bandage contact lens in a non-descript dog

Bhumika Kesanur, KM Srinivasa Murthy, BN Nagaraja, V Mahesh and Manjunatha K

Abstract
Corneal ulcer is a painful ocular condition, commonly caused by trauma. Most of the medical and surgical therapies currently offered are expensive, not tolerated by the animal, hard to obtain, less efficacious or require high technical skill. A 2-year-old male Indian non-descript dog was presented to the Department of Veterinary Surgery and Radiology, Veterinary College Hospital, Hebbal, Bengaluru, with the history of ocular discharge, pawing at the eye and ocular pain following a fight with another dog. The condition was diagnosed as corneal ulcer using Fluorescein Dye Test. The animal was subjected to corneal debridement, followed by application of bandage contact lens under general anaesthesia. The animal recovered uneventfully by Day 7 and complete transparency of cornea was restored by Day 14 post-operatively.

Keywords: Bandage contact lens, corneal ulcer, non-descript dog, corneal debridement

1. Introduction
Corneal ulcer is a highly painful condition of the eye and often leads to loss of vision in exacerbated or untreated cases. Kirschner (1990) [7] stated various etiologies of corneal ulcers such as morphologic and neurologic abnormalities of the eyelids, distichiasis or ectopic cilia, tear film abnormalities, deficiencies of corneal innervation, foreign bodies, microbial infection, spontaneous chronic corneal epithelial defects (SCCED), and ulcerative keratitis associated with bullous Keratopathy. According to Patel *et al.* (2020) [10], the most common cause of ulcerative keratitis was observed to be trauma (62.16%) followed by keratoconjunctivitis sicca (27.02%), entropion (8.10%) and chemical insult (2.70%).
Moore (2003) [8] gave a simple and clinically relevant classification of corneal ulcers. He classified ulcers that included only the epithelial layer and minimally involved the stroma or did not involve the stroma at all as superficial ulcers and ulcers that involved one half or greater than half of the stromal depth were classified as deep ulcers.
Many corneal ulcers caused by trauma often develop secondary infections that worsen the condition and necessitate surgical therapy. Indian non-descript dogs are known by reputation to be intelligent, tenacious, sometimes aggressive and often non-co-operative for repeated examination and treatment. Many cases of self-mutilation have also been observed in this breed by the authors. Often, these dogs are stray, with no owner and are cared for by charity organisations and the general public. Hence, the non-availability of a constant caretaker limits the treatment options in these animals. For the same reasons, a wide variety of successful surgical therapies like conjunctival grafts or keratoplasties may face a higher rate of failure in this breed. Treatment with biomembranes and scaffolds is difficult due to high cost and low availability. Many cases of corneal ulcers go untreated or receive inadequate treatment because of lack of awareness about simpler and cheaper techniques. A vast majority of treatable cases end up undergoing enucleation as a radical therapy, because of these constraints.
In the present case, a male non-descript dog presented with a corneal ulcer (Fig. 1.), was treated with a bandage contact lens. Wooff and Norman (2015) [13], Grinninger *et al.* (2015) [5], Morgan *et al.* (1984) [9] and many other authors reported reduced healing time when bandage contact lenses were used. A good outcome was recorded by these authors in most of the cases. Hydrophylic polyxylon bandage contact lenses (BCLs) designed for dogs have been demonstrated to be an effective tool in the management of refractory ulcers as they helped to protect the new epithelium and to maintain apposition to the stroma (Chandler *et al.*, 2010) [2].

2. Materials and Methods

Fluorescein dye test was used to diagnose the condition as corneal ulcer (Fig. 2). Complete physical, physiological and ophthalmic examination was conducted to assess the corneal ulcer and to rule out other systemic illnesses. Schirmer Tear Test was conducted to assess tear production and detect abnormalities. Corneal swabs were collected and subjected to culturing and antibiotic sensitivity testing. Vision function tests were performed regularly to assess quality of vision.

2.1. Pre-surgical preparation

The dog was kept off-feed for approximately 12 hours and without water for approximately 6 hours prior to the procedure. Pre-operative antibiotic Ceftriaxone at 25 mg/kg body weight (intravenous) and analgesic Meloxicam at 0.3 mg/kg body weight (subcutaneous) were administered 30 minutes before the procedure. Atropine sulphate at 0.04 mg/kg body weight (subcutaneous) and Xylazine hydrochloride at 1mg/kg body weight were administered intramuscularly as pre-anaesthetics. General anaesthesia was induced with 2.5% thiopentone sodium at the dosage of 12.5 mg/kg body weight intravenously and maintained with bolus injection of the same to effect.

The surgical site was prepared by clipping the hairs around the eye, including the eyelashes. The affected eye was flushed with 1: 40 Povidone Iodine solution with normal saline.

2.2. Surgical procedure

The globe of the eye was fixed using a single stay suture (Polyamide, 2-0) and the eyelids were kept away from the surgical site using Leibermann speculum. The corneal ulcer was debrided using sterile dampened cotton-tipped ophthalmic swabs from the centre of the ulcer towards the periphery.

Following corneal debridement, a soft bandage contact lens (AcuvueR Oasys™ with Hydraclear™ Plus with Base Curve of 8.8 mm and diameter of 14 mm) was placed on the cornea, taking care to exclude the third eyelid.

2.3. Post-operative care

The dog was medicated with topical Ciprofloxacin (one drop, four times a day, for five days) in accordance with the results of the antibiotic sensitivity test. Oral Carprofen (at the dose of 2mg/kg body weight, twice daily, for three days) was administered.

2.4. Post-operative evaluation

Fluorescein dye test was conducted on 7th, 14th and 28th post-operative days to assess corneal healing. Vision function tests were performed on 1st, 3rd, 5th, 7th, 14th and 28th days post-operatively.

Corneal opacity and vascularisation were evaluated after the surgery and on 7th, 14th and 28th days. Changes in corneal opacity and vascularisation were monitored by using the SPOTS system of grading as introduced by Eaton *et al*. (2017) [4], who included a scale of five categories:

0 - Normal cornea.

1. Minimal corneal opacity. With diffuse illumination, the underlying structures are clearly visible.
2. Mild corneal opacity. With diffuse illumination, the underlying structures are visible, with a reduction in the detail.
3. Moderate corneal opacity. With diffuse illumination, there is a greater reduction in the underlying details but the observer is still able to observe for pupillary response and lenticular changes.
4. Severe corneal opacity. With diffuse illumination, the underlying anterior segment structures cannot be seen.

3. Figures

Fig 1: Pre-operative photograph of corneal ulcer in a 2-year-old male Indian non-descript dog

Fig 2: Positive fluorescein dye test

Fig 3: Contact lens in-situ on Day 3

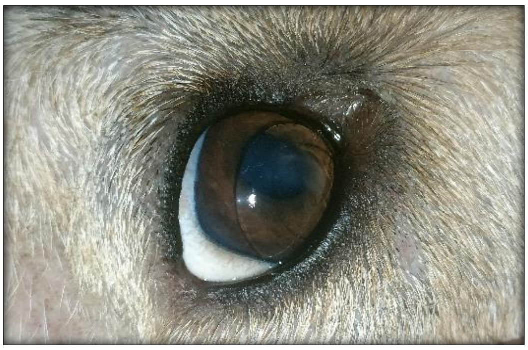

Fig 4: Reduced corneal opacity on Day 5

Fig 5: Negative fluorescein dye test on Day 7

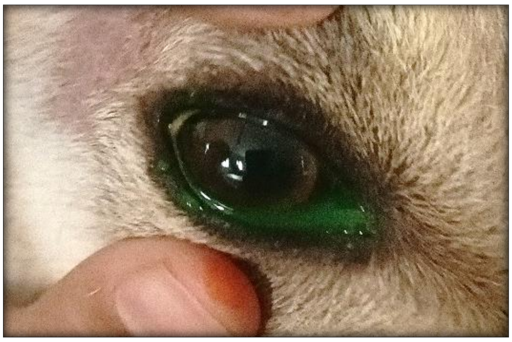

Fig 6: Transparent cornea on Day 14

4. Results and Discussion

The haematological and biochemical parameters were within the normal range.

4.1. Microbiological analysis

The corneal swab was subjected to culturing and antibiotic sensitivity testing. The culture was positive for Staphylococcus aureus and the organism was susceptible to Ciprofloxacin, Chloramphenicol and Piperacillin-Tazobactam.

4.2. Retention of lens

The bandage contact lens was retained till the 7th post-operative day, when it was removed by the veterinarian to perform the Fluorescein dye test. No discomfort or attempt at self-mutilation was reported by the dog owner. Diehl *et al* (2018) [3] and Bossuyt (2016) [1] also recorded similar lens retention times.

4.3. Assessment of ulcer healing

4.3.1. Vision function tests

Palpebral reflex, cotton ball test, menace response and pupillary light reflex were assessed before the surgery, after the surgery and on 1st, 3rd, 5th, 7th, 14th and 28th days post-operatively. All the vision function tests yielded normal responses on all the days.

4.3.2. Fluorescein dye test

Fluorescein dye test was negative on the 7th post-operative day, indicating adequate epithelialisation. Grinninger *et al.* (2015) [5] in his study, used bandage contact lens for spontaneous corneal epithelial defects in dogs and observed a mean corneal healing time of 14 days.

4.3.3. Schirmer tear test

The Schirmer Tear Test showed a reading of 24mm. By 7th post-operative day, the reading had reduced to 19mm. The higher readings pre-operatively could be due to the pain and ocular irritation causing more lacrimation (Williams and Burg, 2017) [12], which gradually reduced as the ulcer healed.

4.3.4. Corneal opacity

The corneal opacity was graded as 2 pre-operatively. By 3rd post-operative day, the grading had improved to 1. On 14th post-operative day, the corneal opacity was graded as 0 (Figures 3-6).

5. Conclusion

The lens was soft and easy to place. It showed good adherence to the cornea upon proper placement. The Base Curve of 8.8 mm was observed to be adequate. However, the diameter of 14mm was found to be inadequate to cover the entire cornea and this could be problematic if the ulcer is peripheral in position. The main advantage was the ability to monitor and assess the corneal healing and vision function with ease, as also expressed by Startup (1984) [11]. The micropores in the contact lens allowed for proper action and maximum efficacy of topical medications. Gosling *at al.* (2013) proposed that the beneficial effects of contact lens on corneal ulcer healing was due to the pressure applied by the lens on the cornea and the protection of newly differentiated migrating epithelial cells of the cornea.

6. References

1. Bossuyt SM. The use of therapeutic soft contact bandage lenses in the dog and the cat: a series of 41 cases. Vlaams Diergeneeskundig Tijdschrift. 2016;85(6):343-348.
2. Chandler HL, Gemensky-Metzler AJ, Bras ID, Robbin-Webb TE, Saville WJA, Colitz CMH. *In vivo* effects of adjunctive tetracycline treatment on refractory corneal ulcers in dogs. Journal of American Veterinary Medicine Association. 2010;237(4):378-386.
3. Diehl KA, Bowden AC, Knudsen D. Bandage contact lens retention in dogs-A pilot study. Veterinary Ophthalmology. 2019;22(3):584-590.
4. Eaton JS, Miller PE, Bentley E, Thomasy SM, Murphy CJ. The SPOTS System: An Ocular Scoring System Optimized for Use in Modern Preclinical Drug Development and Toxicology. Journal of Ocular Pharmacology and Therapeutics. 2017;33:718-734.
5. Grinninger P, Verbruggen AMJ, Kraijer-Huver IMG, Djajadiningrat-Laanen SC, Teske E, Boevé MH. Use of bandage contact lenses for treatment of spontaneous chronic corneal epithelial defects in dogs. Journal of Small Animal Practice. 2015;56(7):446-449.
6. Gosling AA, Labelle AL, Breaux CB. Management of spontaneous chronic corneal epithelial defects (SCCEDs) in dogs with diamond burr debridement and placement of a bandage contact lens. Veterinary Ophthalmology. 2013;16(2):83-88.
7. Kirschner SE. Persistent corneal ulcers. What to do when ulcers won't heal. Veterinary Clinics of North America: Small Animal Practice. 1990;20(3):627-642.
8. Moore PA. Diagnosis and management of chronic corneal epithelial defects (indolent corneal ulcerations). Clinical Techniques in Small Animal Practice. 2003;18(3):168-177.
9. Morgan RV, Bachrach AJ, Ogilvie GK. An evaluation of soft contact lens usage in the dog and cat. Journal of

American Animal Hospital Association. 1984;20(6):885-888.

10. Patel KP, Parikh PV, Mahla JK, Ashwath SN, Kelawala DN. Incidence of Corneal Ulcer in Dogs – A Retrospective Study. International Journal of Current Microbiology and Applied Sciences. 2020;9(8):3174-3179.
11. Startup FG. Corneal ulceration in the dog. Journal of Small Animal Practice. 1984;25(12):737-752.
12. Williams DL, Burg P. Tear production and intraocular pressure in canine eyes with corneal ulceration. Open Veterinary Journal. 2017;7(2):117-125.
13. Wooff PJ, Norman JC. Effect of corneal contact lens wear on healing time and comfort post LGK for treatment of SCCEDs in boxers. Veterinary Ophthalmology. 2015;18(5):364-372.