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Clinical Evaluation of Two Techniques for Surgical Correction of Prolapsed Gland of the Third Eyelid in Dogs

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ABSTRACT

The current study was undertaken to evaluate the clinical outcome and post surgical complications of two techniques for correction of prolapsed of third eyelid gland in dogs. The study was conducted in twelve clinical cases with unilateral prolapse of third eye lid gland in six and bilateral prolapse in six dogs, presented to Veterinary clinical complex (VCC), College of Veterinary Science,Jabalpur. Partial excision technique and Morgan's pocket technique were employed for the treatment. Schirmer tear test values were recorded for the dogs subjected to surgical procedures on 1,7,15 and 30 postoperative days. Other complications were recorded till 30 days post procedure. Recurrence of prolapsed gland of third eyelid and development of Keratoconjunctivitis Sicca was followed up for 12 months. It was noted that till 30 days, no significant difference on tear production was observed in dogs subjected to either of procedure. Keratoconjunctivitis Sicca and corneal ulcer were reported in only one eye (n=1/9) in partial excision Group-I after 80 days. In the Group-II, one eye (n=1/9) suffered recurrence of prolapsed gland of third eye lid on day 11, post procedure due to suture break. It was concluded that, both partial excision of third eye lid gland and Morgan's pocket technique can be used effectively for correction of cherry eye condition. The choice of technique is dependent on surgeon's choice and competency.

HIGHLIGHTS

- The study evaluates the clinical outcome and post surgical complications of two techniques for correction of prolapsed of third eyelid gland in dogs.
- No significant difference on tear production was observed.

Keywords: Third eye lid gland, Morgan's pocket technique, Partial excision technique

The gland of the third eyelid is held in place by a connective tissue attachment between the ventral third eyelid membrane and the periorbital tissues. Prolapse of gland of third eye lid is referred to as "Cherry eye" and most commonly occur in dogs and cats (Raza, *et al*., 2013). Laxity of connective tissue attachment between the gland and ventral periorbital tissues, as well as antigen-stimulated gland enlargement, is thought to be predisposing risk factors (Hendrix, 2007; Maggs, 2013). It is believed that prolapse of the gland may occur secondary to inflammation. Further, weakness in the connective tissue attaching the gland to its normal position posterior and ventral to the nictitans, allowing the gland to migrate dorsally and flip up to protrude above the leading margin of the membrane (Hendrix, 2007).

Different techniques, which are in practice for correction of cherry eye, vary in efficacy due to surgical complexity, breed conformation differences, effects on third eyelid mobility, cartilage position, gland function, risks of complications and surgical failure (Gomez, 2012). Repair is thought to be less successful in some giant and

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brachycephalic breeds (e.g., Neapolitan Mastiffs, English Bulldogs) (Turner, 2008; Martin, 2009) and in cases of prolapsed of longstanding duration (Dehghan *et al*., 2012).

Before 1980, the treatment of choice was partial or complete removal of the gland (Plummer *et al*., 2008). These procedures were later shown to reduce tear production promoting Keratoconjunctivitis Sicca (KCS) in both dogs and cats. Excision of the glands may not cause the development of KCS, but it will certainly hasten its development and severity in animals that are predisposed to dry eye.

Conjunctival pocket techniques and medications thereof are quick and simple to perform, giving good cosmetic and functional results. However, if the elliptical incisions that form the walls of the pocket are connected, tears will be unable to escape, and a cyst may form (Hendrix, 2007).

Recently,the surgical techniques for the correction of prolapsed glands of the third eyelid have been reviewed and it was noted that there is currently insufficient evidence to ascribe superior surgical success rates and lacrimal outcomes to any particular technique (White and Brennan, 2018).

In the present study evaluation of the post operative outcome of two different surgical procedures (Partial excision technique vs. Morgan's pocket technique) for correction of prolapsed gland of third eyelid was undertaken.

MATERIALS AND METHODS

During the period of four years, twelve cases of different breeds, gender and age of dogs were selected for the study at Veterinary Clinical Complex. These were presented with indication of prolapsed gland of third eye lid (six dogs with unilateral and six dogs with bilateral condition). Detailed ophthalmic examinations were conducted and recording of data for breed, gender, age, unilateral or bilateral prolapse was done. These dogs were divided into two groups with six dogs each for surgical correction of prolapse of third eye lid gland. Nine eyes were subjected to correction by partial excision of prolapsed nictitating membrane gland, whereas other nine were subjected to Morgan's pocket technique. Post operative observation for complications and tear production rate was done for 30 days. After 30 days, owner's feedback was taken for recurrence of prolapse and or development of KCS for 12-month post procedure. All the dogs underwent preoperative medication protocol of ophthalmic antibiotic drop Moxifloxacin (0.5%, Moxi Laborate Pharamaceuticals India Ltd, Paonta Sahib, H.P.), Flurbiprofen eye drops (0.3%, Flur, Allergan India Pvt. Ltd) three times a day for three days.

Surgical protocol

Surgical procedure was performed under general anaesthesia in both the groups. Premedication was done using Inj. Atropine sulphate @ 0.02 mg/kg. IM &Inj. Diazepam @ 1 mg/kg intravenous(IV). Anaesthesia was induced by using Inj. Propofol@ 4 mg/kg IV till effect. During surgical procedure anaesthesia was maintained by Isoflurane (1.2–2%) and 100% oxygen delivered by a breathing system. The surgical area was draped carefully to expose only the palpebral fissure. Entire surgical area was prepared by applying 0.5% Povidine iodine.

Partial Excision Technique

The third eyelid was grasped and exteriorized with the help of two stay suture by polyglactin 910 no. 5/0 for eversion of third eye lid. Protruded gland was held by blunt forceps. To obliterate the blood supply, mattress suture was applied at the base of protrusion in a manner so that the knot of the suture was positioned toward the palpebral conjunctival side. After application of a row of sutures at the base / above from the base and application of curved mosquito forceps just cranially above to the suture line, the excision of the prolapsed gland was done. After excision of the glandular mass, mosquito forceps which was applied at the base was released.

Morgan's Pocket technique

The Morgan's pocket technique was applied in three unilateral and three bilateral prolapsed glands of six cases. The third eyelid was grasped and exteriorized with two stay sutures on either side of protruded mass. Two superficial curvilinear incisions were made by electrocautery parallel to the free margin on the bulbar side of the third eyelid; then by curved scissors the subconjunctival tissue was separated from the gland. The gland was then easily tucked into the pocket and the conjunctival edges were closed using 6/0 polyglactin 910 sutures, using a simple

continuous suture pattern. Two rows of sutures were applied**.** After the procedure eyes were washed with normal saline.

Post-operative treatment protocol

After the surgical procedure, all the patients were treated topically with ophthalmic antibiotic drop Moxifloxacin (0.5%, Moxi Laborate Pharamaceuticals India Ltd.), Flurbiprofen eye drops (0.3%, Flur Allergan India Pvt. Ltd) three times a day for 10 days, postoperatively. Antibiotic Amoxicillin and Cloxacillin with Clavulanic acid were prescribed @ 25 mg/Kg intramuscular (IM), for three to five days depending upon the condition. Elizabethan collar was applied in all the cases, postoperatively.

In bilateral cases, initially the surgical procedure was performed in one eye and after 7 -10 days gap other eye was subjected to surgical procedure. Post operatively all the cases were observed for ocular discharge (STT) till 30 days and other complications like corneal ulcers and development of KCS/ recurrence of prolapsed gland till 12 months.

RESULTS AND DISCUSSION

The ophthalmic examinations of twelve dogs revealed prolapsed gland of third eyelid in left eye (OS) in 6 dogs and other 6 dogs were having bilateral prolapsed gland of third eyelid. The age of dogs ranged from 3 months to 30 months. Mazzucchelli *et al*. (2012) reported that 75.4% of the first prolapse occur before one year of age. They also observed Unilateralnictitans gland prolapse in 64% and bilateral conditions in 41.4% cases. Further, it was reported that cherry eye condition was more frequent in animals younger than 24 months (Peixoto and Galera, 2012). The duration of condition prior to surgical procedure ranged from 1 to 6 months.

In the current study, more incidences were noted in Beagle breed (n=5/12), which is consistent with earlier reports (Martin, 2009) and it was noted that certain breeds such as Beagle, American Cocker spaniel, Boston terrier, Poodle, and other brachycephalic breeds are more prone to develop the condition. O'Neill *et al*. (2022) reported that brachycephalic skull conformation predispositions suggest a hereditary involvement in prolapsed nicitating membrane gland condition development.

Due to small population, assessment of gender predisposition was not done. Due to small study population (n=12) consists of male (n=7/12) and female (n=5/12), no gender predisposition could be assessed in the current study. Thus, earlier reports in the literature in which predisposition for males (Mazzucchelli, *et al*., 2012) has been reported could not been confirmed. However, many previous studies failed to support a gender predisposition (Plummer, *et al*., 2008; Premont, *et al*., 2012) for cherry eye condition.

The preoperative mean STT values of group-I was recorded as 19.00±1.00 mm/min and in group-II it was noted as 18±1.30 mm/min in dogs operated for left eye condition (OS). Preoperative mean STT values of the affected right eye (OD)was recorded in group-I as 19.33±0.50 mm/min and in group-II as 19.33±0.41 mm/min.

STT values of group-Ion postoperative day 1 ranged from 21 to 25 mm/min with mean value of 23.00±0.63 mm/min. This was 21.05% higher than mean preoperative value. After increment on first day a declining trend was observed on subsequent days. On day 7, STT values of group-I ranged from 17 to 23 mm/min with a mean of 20.00±1.10 mm/min, which was 5.26% higher than preoperative value. Subsequently, on day 15, adecline of -4.21% was observed in STT values compared to preoperative value (18.20±0.49 vs. 19.00±1.00 mm/min). A decline of -9.47% was recorded on postoperative day 30 when compared to STT value on preoperative day (17.20±0.58vs. 19.00±1.00 mm/min).

Whereas in group-II, STT values on day 1 ranged from 18 to 26 mm/min with mean value of 21.60±1.36 mm/min, which was 20.00% higher than preoperative STT value. STT values on day 7 ranged from 19 to 23 mm/min with mean value of 20.80±0.73 mm/min, which was 15.56% higher than preoperative STT value. On day 15, an increase of 3.33% was observed in STT values in comparison to preoperative values (18.60±0.50 vs. 18.00±1.30 mm/min). However, on day 30, a slight decline of -2.22% was recorded compared to preoperative STT value (17.60±0.40 vs. 18.00±1.30 mm/min).

After surgical procedure on right eye, STT values have been recorded. On day 1, mean STT values of group-I recorded as 23.75±0.63 mm/min with an increase of 22.84% and group-II mean values as 23.25±0.48 mm/min with an increase of 20.26% compared to preoperative STT

Table 1: Comparative STT values (mm/min) of two groups

Technique		**G-1 Partial excision technique**								
Breed		**Labrador**	**Beagle**	**Beagle**	**St. Bernard**	**Beagle**	**Non Descript**	**Mean**	**SE (±)**	**% Change to pre operative value**
Age (Months)		3	24	18	3	12	10			
Sex		Male	Male	Male	Female	Male	Female			
Eye		OS, OD	OS, OD	OS, OD	OS	OD	OS			
Duration (Months)		1	6	3	1	1.5	2	2.42	0.78	—
STT (Pre-operative)	OS	19	16	18	22	—	20	19.00	1.00	—
	OD	20	18	20	—	20	—	19.33	0.50	—
STT Post op.(Day-1)	OS	24	21	22	24	—	24	23.00	0.63	21.05
	OD	24	22	24	—	25	—	23.75	0.63	22.84
STT Post op.(Day-7)	OS	22	17	19	19	—	23	20.00	1.10	5.26
	OD	21	18	21	—	22	—	20.50	0.87	6.03
STT Post op.(Day-15)	OS	20	17	18	18	—	18	18.20	0.49	-4.21
	OD	20	18	19	—	19	—	19.00	0.41	-1.72
STT Post op. (Day-30)	OS	18	15	17	18	—	18	17.20	0.58	-9.47
	OD	19	17	18	—	17	—	17.75	0.48	-8.19
Technique		**G-2 Morgan's pocket technique**								
Breed		**Beagle**	**Labrador**	**Labrador**	**Non descript**	**Beagle**	**Basset Hound**	**Mean**	**SE (±)**	**% Change to pre operative value**
Age (Months)		4	7	12	12	30	18			
Sex		Male	Male	Female	Male	Female	Female			
Eye		OS	OD	OS	OS,OD	OS,OD	OS,OD			
Duration (Months)		1	2	4	4	3	3	2.83	0.48	—
STT (Pre-operative)	OS	16	—	15	20	22	17	18.00	1.30	—
	OD	—	18	—	19	20	19	19.33	0.41	—
STT Post op. (Day-1)	OS	20	—	18	23	26	21	21.60	1.36	20.00
	OD	—	22	—	24	23	24	23.25	0.48	20.26
STT Post op. (Day-7)	OS	20	—	19	22	23	20	20.80	0.73	15.56
	OD	—	21	—	22	22	21	21.50	0.29	11.21
STT Post op. (Day-15)	OS	19	—	17	20	19	18	18.60	0.51	3.33
	OD	—	20	—	21	19	18	19.50	0.65	0.86
STT Post op. (Day-30)	OS	18	—	17	19	17	17	17.60	0.40	-2.22
	OD	—	18	—	18	17	17	17.50	0.29	-9.48

values. On day 7, mean STT value of group-I recorded as 20.50±0.87 mm/min with an increase of 6.03% and those of group-II as 21.50±0.29 mm/min with increase of 11.21% compared to preoperative values. On day 15, mean STT values was recorded as 19.00±0.41 mm/min for group-I with slight decrease of -1.72% when compared to preoperative values. Mean STT values of group-II on day 15 was recorded as 19.33±0.88 mm/min. Mean STT values of group-I on day 30 was noted as 17.75±0.48 mm/min with a decrease of -8.19% and in group-II mean STT value was noted as 17.50±0.29 mm/min with a decrease of -9.48% compared to preoperative value.

Postoperative complications included suture break in one of the dogs of group-II on day 11 postoperative. In group-I, one dogs exhibited development of corneal ulcer on day 80 and subsequently, KCS was diagnosed on day 90, postoperative.

The comparison of ocular discharge between various postoperative days revealed that on dogs subjected to partial excision technique, highest STT values were recorded on day 1, which adopted a declining trend in later days of observation (23.00±0.63 vs. 19.00±1.00, 23.75±0.63 and 19.33±0.50 mm/min). On postoperative day 15 and 30, the STT values declined below the

preoperative levels. This indicates the impact of excision technique on tear production rates as observed in earlier report (Rhodes, 2014).

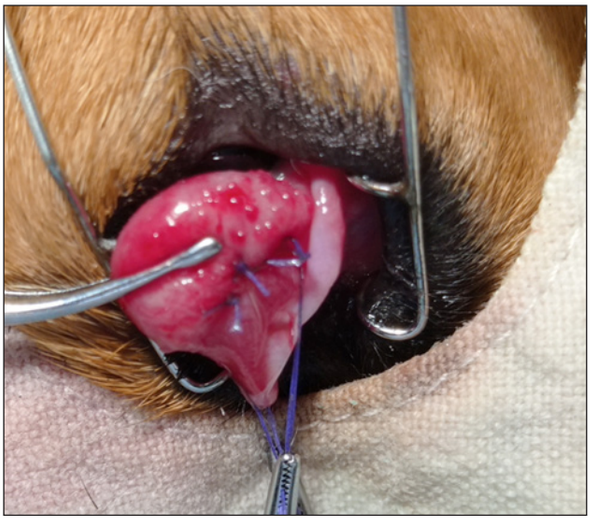

Fig. 1: Horizontal mattress applied at the base of prolapsed gland

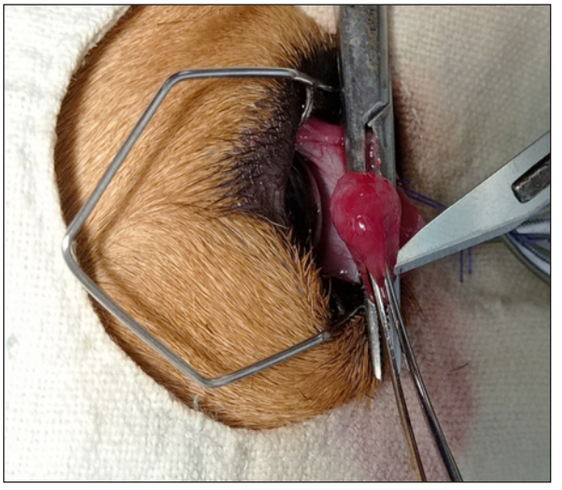

Fig. 2: Excision of part of prolapsed gland

Similarly, in group-II, highest STT values were recorded on day 1 post procedure (21.60±1.36 and 23.25±0.48 mm/min). However, unlike group-I observation, till day 30, increment in tear production was recorded for group-II. Only on day 30, minor decline was observed when compared to preoperative values, which shows comparatively less impact of Morgan's pocket technique on tear production.

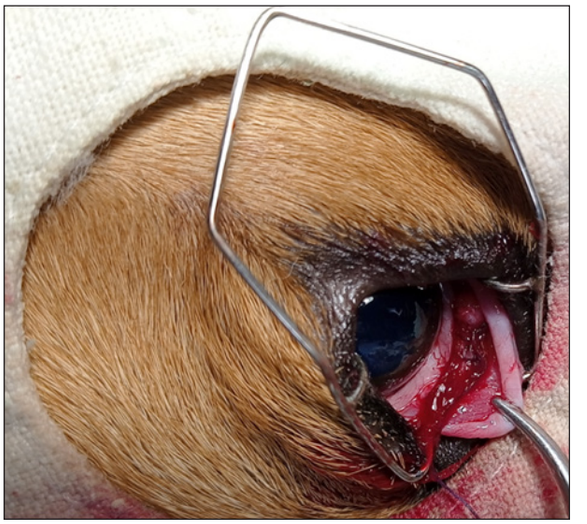

Fig. 3: After partial excision of prolapsed gland

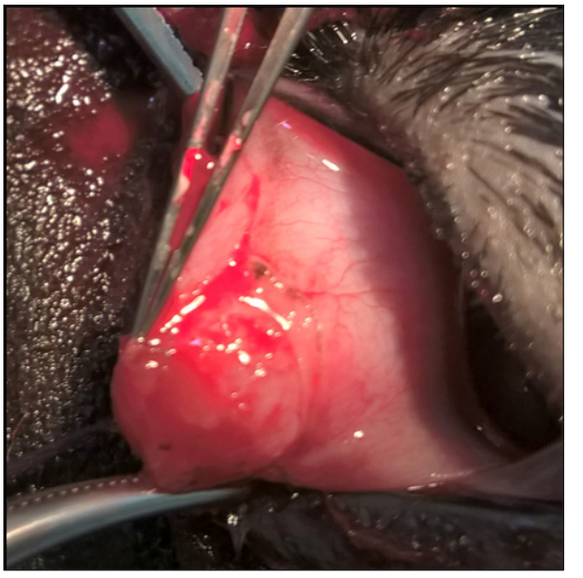

Fig. 4: Incision on bulbar conjunctiva (Morgan's Pocket technique)

However, in both the groups till 30th day postoperative, tear productions rates did not fall to critical levels of 11-14 mm/min as suggested (Rhodes, 2014)for development of KCS. This may be due to unaltered tear production by

lacrimal gland and less impact on third eyelid gland due to partial excision of the same in group-I and pocket technique on group-II. No significant change in tear volume after one year post excision procedure and maintenance of tear volume by reflex tear secretion (Saito, *et al*., 2001).

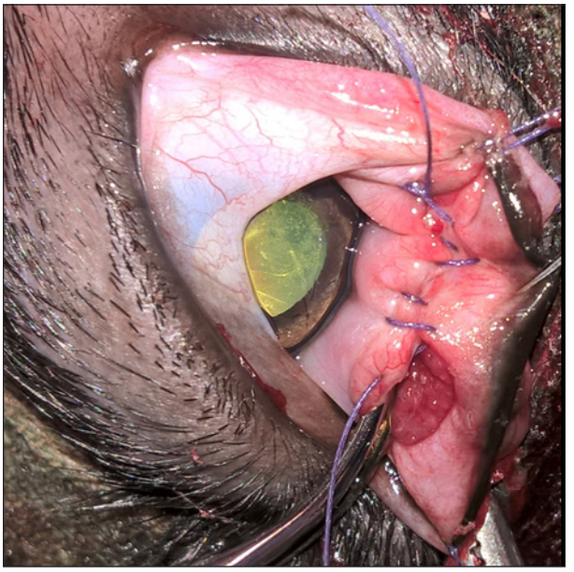

Fig. 5. Closing of conjunctival edges by continuous suture (Morgan's Pocket technique)

In the current study, KCS and corneal ulcer were reported in only one eye (n=1/9) in partial excision group-I after 80 days. This can be attributed to inadvertent complete removal of third eyelid gland during surgical procedure. In the group-II, one eye (n=1/9) suffered recurrence of prolapsed gland of third eye lid on day 11, post procedure due to suture break. The success rates of pocket replacement procedure (89%)are consistent with earlier report (Dehghan, *et al*., 2012) with 94.1% and 97% success rate, respectively. Correct positioning of sutures should be done to avoid corneal injury from the contact of the thread with the cornea (Gomez, 2012).

CONCLUSION

Current study undertook clinical evaluation of two techniques for correction of prolapsed gland of third eyelid in dogs. It was noted that till 30 days, no significant difference on tear production was observed in dogs subjected to either of procedure. By the end of 12-month follow-up period, no clinical cases of KCS due to decreased tear production or recurrence of cherry eye condition was noted in any of the dogs except one in each group. Thus, it can be said, both the techniques, partial excision of third eye lid gland and Morgan's pocket technique can be used for correction of cherry eye condition. The choice of technique is dependent on surgeon's choice and competency.

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