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Research Article

STUDIES ON INCIDENCE AND COMPARISON OF TWO MANAGEMENT TECHNIQUES OF NICTITATING MEMBRANE GLAND PROLAPSE IN CANINES

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ABSTRACT

This study was conducted on 19 dogs (6.86%) diagnosed with nictitating membrane gland prolapse out of 277 dogs of ophthalmic affections presented during the study period. Out of 29 eyes of 19 dogs belonging to 8 breeds, Rottweiler (31.58%, N=6) was the most commonly represented breed. Among 19 dogs, 10 dogs (52.63%) had bilateral protrusion of glands. Male animals (68.42%, N=13) were affected more as compared to female animals (31.58%, N=6). Animals of age group 0-2 years (73.68%, N=14) were the most affected followed by 2-5 years (26.32%, N=5). The condition was managed surgically by two methods. Modified Morgan's pocket technique (MMPT), *i.e*., repositioning of gland was performed in acute and small sized prolapsed gland, whereas excision technique was done in chronic, large sized, inflamed and/or infected prolapsed gland cases. During postoperative period, Schirmer Tear Test (STT) values were within normal range with no clinical problem in both the groups. In the present study, the MMPT demonstrated a 100% success rate in the surgical repositioning of acute and small-sized prolapsed glands, while third eyelid gland excision emerged as a more appropriate method for managing chronic, large-sized, inflamed and infected prolapsed glands.

Keywords: Cherry eye, Excision technique, Modified Morgan's pocket technique, Nictitating membrane gland, Rottweiler

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The third eyelid or nictitating membrane gland in canines was a major contribution in maintaining the aqueous portion of tear film. Dogs frequently come across diseases of third eyelid and among all, 'cherry eye' or prolapse of the third eyelid gland is the most commonly encountered primary disorder (Plummer *et al.*, 2008). Etiology of this condition is not clear, but weakness in connective tissue attachment of gland to periorbital tissues might be responsible for occurrence (Maggs, 2008). Third eyelid gland prolapse can be managed either by replacement of gland by MMPT or excision of gland. Excision of the gland leads to 'dry eye' condition, as the gland constitutes about 30% of tear production. Re-prolapse of gland may occur in repositioning methods, especially in cases with marked pre-operative inflammation or due to lack of post-operative owner's compliance (Raza *et al.*, 2013). However, appropriate pre-surgical measures, suitable surgical procedure and owner's postoperative compliance can curtail risk. Keeping in view the above facts, the present study was undertaken to study the hospital incidence, to evolve diagnostic and therapeutic protocols and also to compare the MMPT and excision of gland technique for management of cherry eye in dogs.

MATERIALS AND METHODS

The present study was carried out on 19 dogs (6.86%) diagnosed with cherry eye out of 277 dogs of ophthalmic affections presented at Veterinary Clinical Complex (VCC), Kothari Veterinary Hospital, College of Veterinary Science and Animal Husbandry, U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan, Mathura (U.P.) between January, 2023 and December, 2024.

Clinical cases of nictitating gland prolapse, seen as a dark pink to reddish mass towards medial canthus, either unilateral or bilateral and acute or chronic were included in the study (Fig. 1a and b). Conjunctivitis and ocular discharges were noticed as a common clinical sign in all the affected eyes. Affected eyes were palpated to differentiate the prolapsed gland from cartilage eversion condition. On the basis of history, clinical and physical examination, cherry eye condition was diagnosed. Incidence of cherry eye was recorded as per breed, age, gender and affected eye/s. Age-wise animals were divided into 1-5 groups, i.e., 0-2 years, 2-5 years, 5-8 years, 8-10 years and > 10 years of age, respectively.

All cases of cherry eye underwent surgical management under general anaesthesia. The animals were divided into two groups, i.e., group-I and group-II based on the condition of the prolapsed nictitating membrane glands. The animals of the group-I (n=16) were treated by MMPT whereas the animals of the group-II (n=3) were treated by excision technique. In MMPT, repositioning of gland was performed in acute and small sized prolapsed gland, whereas excision technique was done in chronic, large sized, inflamed and/or infected prolapsed gland cases

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with normal tear production (STT value- 15-20 mm). As gland helps in tear production, a risk of dry eye is there in any stage of life. Hence, only highly inflammed, enlarged and complicated chronic cases, but with normal STT values, underwent excision of gland. Cases managed by MMP may also encounter with re-prolapse complication especially in enlarged prolapsed gland and require repeated surgery that disappoint owners. Considering these facts, excision of gland was opted only in three cases that may encounter re-prolapse if were managed by MMP.

In all cases, 1 drop of moxifloxacin (0.5%) and dexamethasone (0.1%) ophthalmic drops instillation was started 72 hours prior to surgery with an interval of 6 hours. Systemic antibiotic amoxicillin-sulbactam combination @ 10 mg/kg b.wt. I/V and tramadol @ 2 mg/kg b.wt. slow I/V were administered 60 minutes prior to surgery. Anaesthetic protocol included premedication with atropine sulphate (0.6 mg/ml) @ 0.04 mg/kg b.wt. I/M, followed 15 minutes later by sedation with butorphanol tartrate (2 mg/ml) @ 0.2 mg/kg b.wt. deep I/M and midazolam (1 mg/ml) @ 0.2 mg/kg b.wt. I/V. Induction of anaesthesia was performed with propofol (10 mg/ml) @ 4 mg/kg b.wt. I/V and maintained by isoflurane at 1.5-2.5%.

Dogs were kept in lateral recumbency with affected eye upward and head was positioned on head positioner and adjusted by soft padding in latero-oblique position. Eyelids and periocular area were rinsed with sterile normal saline solution and painted with 5% povidone-iodine solution. Ocular surface and conjunctival sacs were lavaged with 0.5% povidone iodine solutions followed by flushing of eye with sterile saline solution. The eye was draped in triangular fashion and then covered with a single holed sterilized drape. The cornea was often kept wet with sterile normal saline solution.

In MMPT, repositioning of gland was performed as per procedure described by Dehghan *et al.* (2012). An eye speculum was placed to open the eyelids. For better surgical access to the nictitans gland it was pulled out. Two curvilinear incisions were made on bulbar conjunctiva of third eyelid, on both anterior and posterior sides of prolapsed gland. Thereafter, blunt dissection was carried out to create a pocket. Further, gland was placed into its anatomical position and fixed by double row of simple continuous suture with starting and ending knots on anterior surface of third eyelid and 1-2 mm from the gland using 6-0 polygalactin 910 (Fig. 2a-f).

In excision technique, resection of gland was performed as per the method described by Poonia *et al.* (2023). Eyelids were opened using eye speculum. The prolapsed gland was entirely exteriorized by applying traction with thumb forceps and then artery forceps was applied at its base. The third eyelid gland was then excised just above artery forceps using bipolar diathermy (Medilap 400 Dexter) (Fig. 3a-e).

Post-operatively, ophthalmic drops moxifloxacin (0.5%) and flurbiprofen (0.03%) @ 1 drop QID was advised after eye wash with sterile normal saline solution twice for 10 days. Systemic antibiotic amoxicillin-clavulanic acid combination @ 10 mg/kg b.wt. BID PO for 5 days and carprofen @ 2 mg/kg b.wt. OD PO for 3 days were also prescribed. Elizabethan collar was advised for 2 weeks post-operatively. The cases were followed for 1 month with 15 days interval for final outcome and any complications incidences including reoccurrence of prolapse, induction of a corneal ulcer during the operation or post-operatively and occurrence of keratoconjunctivitis sicca condition.

RESULTS AND DISCUSSION

Total 277 ophthalmic cases in canine were registered at Surgery OPD, VCC during the study period from January, 2023 to December, 2024. Out of these 277, 19 dogs (6.86%) were diagnosed with cherry eye condition. In the present study, 29 eyes of 19 dogs belonging to 8 breeds were diagnosed with third eyelid gland prolapse (Table 1). The most commonly represented breed was Rottweiler (31.58%, N=6), followed by Pitbull, Beagle, Labrador (15.79%, N=3 each), Shih Tzu, Bulldog, Lhasa Apso and Great Dane (5.26%, N=1 each). Among 19 dogs, 10 dogs (52.63%) had bilateral protrusion of glands. Of the unilateral prolapse, left eye was affected in 26.32% (N= 5) dogs and the right eye was affected in 21.05% (N= 4) dogs. On the other hand, Oguntoye *et al.* (2022) reported highest presentation of cherry eye in Boerboels (45.2%) followed by Lhasa Apso (9.4%) and Rottweiler (12.9%) with more unilateral (58.1%) representation than bilateral (41.9%). Nictitating gland prolapse is over represented in certain breeds of dogs. O'Neill *et al.* (2022) found that specific breeds have remarkably high odds for prolapse and have a strong genetic predisposition. They reported an odds ratio of 6.93 in brachycephalic breeds as compared to non-brachycephalic breeds. Anatomical specialities in the skull conformation subsequent to crowding of inferior orbital space in brachycephalic breeds might be a contributing factor to prolapse. Though, Rottweiler is not typically brachycephalic but might have variations in skull shape due to breeding practices making them prone for ocular problems (Williams, 2024). The third eyelid gland is probably more easily prolapsed outside of the orbit, due to its inclined location and much smaller size (Edelmann *et al.*, 2013). Among brachycephalics, American Cocker

Table 1. Clinical signalment and surgical technique performed in 19 dogs affected with cherry eye

S. N.	Breed	Sex	Age (Age group*)	Prolapsed gland	Duration of presentation	Surgical technique	Incidence (%)
1.	Rottweiler	M	1 year(1)	OU	3 months	MMP	31.58
2.	Rottweiler	M	9 months (1)	OD	3 weeks	MMP	
3.	Rottweiler	F	11 months (1)	OD	1 month	MMP	
4.	Rottweiler	F	1.5 years (1)	OU	2 months	MMP	
5.	Rottweiler	F	10 months(1)	OS	3 weeks	MMP	
6.	Rottweiler	M	1.5 years(1)	OU	1 year	Ex	
7.	Pitbull	F	3 years (2)	OU	1 month	MMP	15.79
8.	Pitbull	M	1 year(1)	OU	1.5 months	MMP	
9.	Pitbull	F	2.5 years(2)	OU	3 months	MMP	
10.	Beagle	M	3 months(1)	OS	3 weeks	MMP	15.79
11.	Beagle	M	7 months(1)	OS	1.5 months	MMP	
12.	Beagle	M	3 months(1)	OS	2 weeks	MMP	
13.	Labrador Retriever	M	3 years(2)	OS	5 months	MMP	15.79
14.	Labrador Retriever	F	1.5 years(1)	OD	1 month	MMP	
15.	Labrador Retriever	M	1 year(1)	OU	1.5 months	MMP	
16.	Shih Tzu	M	4 months(1)	OU	2 months	MMP	5.26
17.	Bulldog	M	4 years(2)	OU	3 months	MMP	5.26
18.	Lhasa Apso	M	5 years(2)	OD	3 years	Ex	5.26
19.	Great Dane	M	2 years(1)	OU	1 year	Ex	5.26

Ex- Excision, F- Female, M- Male, MMP- Modified Morgan's pocket, OD- Oculus dexter (Right eye), OS- Oculus sinister (Left eye), OU- Oculus uterque (Both eyes)
*0-2 years (1), 2-5 years (2), 5-8 years (3), 8-10 years (4), > 10 years of age (5)
Values in parentheses represent age group

Spaniel, Beagle, English Bulldog, Lhasa Apso, Shih Tzu, Pekingese are more predisposed to prolapse. In giant breeds prolapse is seen more with concomitant eyelid anomaly. Higher periocular tissue laxity and thus lack of support for third eyelid is responsible for prolapse in these breeds (Guandalini *et al.*, 2017).

In the present study, male animals (68.42%, N=13) were affected more as compared to female animals (31.58%, N=6). Findings were in close agreement with Oguntoye *et al.* (2022) who also observed cherry eye cases more in male (54.8%) as compared to female (45.2%) with majority of the dogs (93.5%) below 2 years. Larger and thicker third eyelid gland in male dogs is a predisposing factor for greater incidences of gland prolapse in males as compared to females (Cabral *et al.*, 2005).

Animals of age group 0-2 years (73.68%, N=14) were the most affected followed by 2-5 years (26.32%, N=5). Findings of the study were in close agreement with findings of Yaygingul *et al.* (2020) who observed 76% incidence in animals of less than 1 year of age group. Etiological factors for prolapse may include trauma, but genetically associated weakness in connective tissue attachment of gland to periorbital tissues is the most common. Young animals up to two years of age are more commonly affected and the condition may be either unilateral or bilateral (Peiffer and Harling, 2002). In all animals of the present study, etiologically, no trauma history was there and thus the weakness of connective tissues that retain the gland in its anatomical position could be determined as probable cause of the prolapse.

Dehghan *et al.* (2012) mentioned that duration of exposure of prolapsed gland is critical. They stated that outcome of surgery is negatively affected with longer exposure of gland (months to years). The duration of prolapse until the time of presentation in the present study varied from 2 weeks to 3 years (Table1). Thus chronic, large sized and/or inflamed prolapsed gland were excised and small sized acute prolapsed mass were repositioned using MMPT.

MMPT was performed in 24 eyes of 16 dogs (84.21%) in group I, whereas 5 eyes of 3 dogs in group-II were subjected to excision of gland (15.79%) (Table 1). In the postoperative period, the dogs were examined at 15 days interval twice for tear production, reoccurrence of condition or suture dehiscence. During postoperative period, STT values were within normal range with no clinical problem in both the groups (Fig. 4a and b). Thus, in the present study, MMPT proved useful in surgical repositioning of the acute and small sized prolapsed gland. Tear production and the morphology of third eyelid gland ducts was also not altered in this technique. Similarly, Poonia *et al.* (2023) also reported no reoccurrence of gland

prolapse in five dogs managed by MMPT In the present study, the MMPT demonstrated a 100% success rate in the surgical repositioning of acute and small-sized prolapsed glands, while third eyelid gland excision emerged as a more appropriate method for managing chronic, large-sized, inflamed and infected prolapsed glands.

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