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Comparative efficacy of modified Morgan's pocket technique and suture anchor placement technique for surgical correction of cherry eye in dogs

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Abstract

This study, titled "Comparative Efficacy of Modified Morgan's Pocket Technique and Suture Anchor Placement Technique for Surgical Correction of Cherry Eye in Dogs," evaluates the efficacy, complications, and recurrence rates of two surgical methods for correcting third eyelid gland prolapse. Twelve dogs were split into two groups of six, with preoperative assessments including ophthalmic exams and treatments to reduce inflammation and infection. The condition was more common in males and dogs under one year, showing symptoms like epiphora and conjunctivitis. Surgeries, performed under general anesthesia with propofol and butorphanol, lasted 20-25 minutes. Postoperative care involved doxycycline, meloxicam, and ciprofloxacin-flurbiprofen drops. Tear production improved significantly by day 30, and tear drainage also improved. Recovery times ranged from 8-15 days, with minimal complications. The Suture Anchor Placement technique was noted for its technical ease and shorter duration compared to the Modified Morgan's Pocket technique.

Keywords: Third eyelid gland, Cherry eye, Prolapse

Introduction

Veterinary ophthalmology presents unique challenges due to the delicate nature of the eye and the necessity for precise medical and surgical interventions (Slatter & Colitz, 2003) ^[18]. Despite the relative ease of diagnostic examination, accurate diagnosis and treatment in veterinary patients can be complex, often requiring sophisticated equipment (Hartley *et al.*, 2007) ^[5]. The canine nictitating membrane, or third eyelid, is integral to ocular health, housing the tubuloacinar seromucoid gland responsible for a significant portion of tear production (Maggs *et al.*, 2008) ^[9]. Prolapse of this gland, commonly known as "cherry eye," is a prevalent primary disorder, particularly affecting young dogs (Plummer *et al.*, 2008) ^[14]. The etiology of prolapse remains unclear, though suspected factors include inflammation and connective tissue weakness (Martin, 2009); Morgan *et al.*, 1993) ^[10, 11]. Historically, gland excision was a common treatment, but concerns over subsequent dry eye development have led to a shift towards surgical repositioning techniques (Dehghan *et al.*, 2011) ^[4]. Two primary methods, the Modified Morgan's Pocket Technique and Suture Anchor Placement Technique, have been established, each with reported successes and limitations (Morgan *et al.*, 1993 Sapienza *et al.* 2014) ^[11]. The present study aims to evaluate the efficacy of these techniques and assess complications and recurrence rates associated with gland prolapse correction. The objectives are to compare the Modified Morgan's Pocket Technique and Suture Anchor Placement Technique for their effectiveness in surgically correcting cherry eye in dogs and to evaluate the incidence of complications and recurrence post-surgery.

Materials and Methods

Anamnesis: Twelve dogs showing signs of third eyelid gland prolapse, deemed suitable for surgery, were chosen for the study. Bilateral prolapse was observed in two of the dogs.

The cases were randomly split into two groups. Details regarding the history, age, breed, sex, affected eye side, and

duration of the condition for each dog is provided in Table 1.

Table 1: Summarizes dogs' age, breed, sex, affected eye, duration, and group allocation details.

	Case No.	Breed	Sex	Eye affected	Age	Duration	Pre-op STT Value (mm/min.)
Group I	1	Beagle	M	Right	5 months	10 days	19
	2	Beagle	M	Right	1.2 years	2 months	12
	3	Lhasa apso	M	Left	4 months	2 days	20
	4	English mastiff	M	Right	1.3 years	1.5 months	15
	5	Labrador Retriever	F	Right	4.5 months	5 weeks	15
	6	St. Bernard	M	Both	5 months	3 weeks	17
Group II	7	English mastiff	M	Right	7 months	6 weeks	15
	8	Beagle	M	Left	8 months	8 days	20
	9	St. Bernard	F	Right	10 months	2 weeks	18
	10	English mastiff	M	Left	5 months	3 weeks	16
	11	Beagle	M	Both	9 months	1 month	14
	12	Beagle	F	Left	4 months	7 days	18

Pre-operative observations

dogs exhibited clinical signs such as epiphora, conjunctivitis, mucoid or mucopurulent discharge & consistent presence of cherry-like hypertrophied third eyelid gland.

Pre-operative assessment

All the dogs underwent a comprehensive ophthalmological examination preoperatively, including assessments such as menace response, pupillary light response and palpebral reflex following the protocol outlined by Ofri (2006) [12].

Schirmer tear test

The Schirmer tear test strip is used to estimate tear production and diagnose keratoconjunctivitis sicca (KCS). Normal values for the Schirmer tear test in dogs are reported to be between 15-25 mm/min. STT was repeated on the 1st, 7th, 15th, 30th days after surgery.

Fluorescein dye-impregnated sterile paper strips were used on the dogs to detect corneal ulcers in the eye. The fluorescein dye test was repeated at regular intervals to detect any corneal defects.

Nasolacrimal duct patency

The Jones test was employed to assess the patency of the nasolacrimal duct (Jones, 1961) [6]. Following the application of a stain to the eye using a fluorescein strip, the external nares were examined for the presence of the stain.



Fig 1: Schirmer's Tear Test (STT)

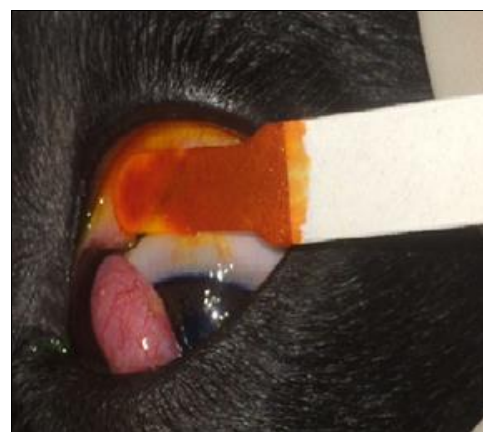


Fig 2: Fluorescein dye test

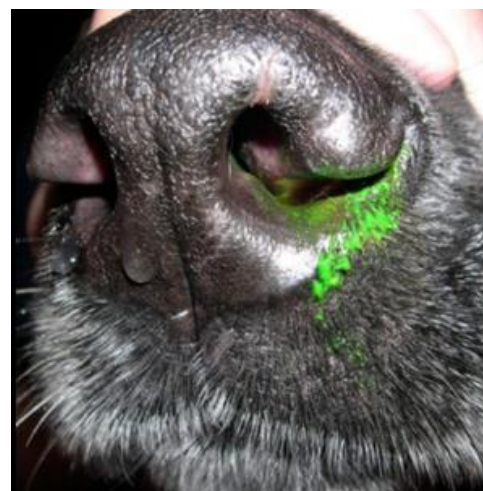


Fig 3: Jones test

Preoperative Medications

3.4.1 Preoperative Medications

1. Topical:

- Antibiotic/corticosteroid combination eye drops: Tobramycin Fluorometholone.
- NSAID eye drop: 0.03% Flurbiprofen sodium.

Each eye drop was instilled at every 8 hours interval for 3 days period prior to surgery to reduce the infection and inflammation of the gland.

2. Systemic: Ceftriaxone and Tazobactam @ 25 mg per kg body weight intravenously prior to surgery.

Anaesthesia Protocol

Animals will be kept off feed for 8-12 hours before surgery. Water will be withheld for 2-4 hours prior to surgery. Prior to the repositioning procedure, all dogs received premedication with atropine sulphate^[10] at a dose of 0.04 mg/kg subcutaneously and butorphanol^[11] at a dose of 0.2 mg/kg intravenously. General anesthesia was induced with 4 mg/kg of propofol^[12] administered intravenously, and a cuffed endotracheal tube was placed.

Surgical technique

Group I - Modified morgan's pocket technique

The surgical repositioning of the prolapsed third eyelid gland was carried out in six dogs using the modified Morgan's pocket technique. This procedure was performed under general anesthesia. The third eyelid was grasped and exteriorized with 2 mosquito forceps. The nictitating membrane's margin was secured with forceps to expose its posterior surface. Two incisions, positioned rostrally and caudally to the prolapsed gland, were made on the posterior surface of the nictitating membrane. These incisions ran parallel to the free margin of the third eyelid. Repositioning of the gland was achieved by suturing the conjunctiva in two layers. The initial layer, using 5-0/6-0 polyglactin 910, followed a simple continuous pattern to close the conjunctival edges over the gland, directing it caudo-ventrally. The second layer employed continuous cushioning sutures with the same material. Suture bites were aligned parallel to the conjunctival edges and passed through the third eyelid, exiting at its anterior surface before knotting to prevent corneal abrasion.

Photographs of Modified Morgan's Pocket technique (Group I)

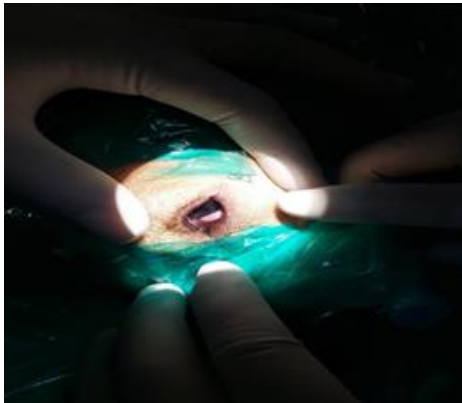


Fig 4: Exposure of palpebral fissure by making slit to drape



Fig 5: Two curvilinear incisions on the conjunctiva, parallel to the free margins are made one dorsally & ventrally to the prolapsed gland.

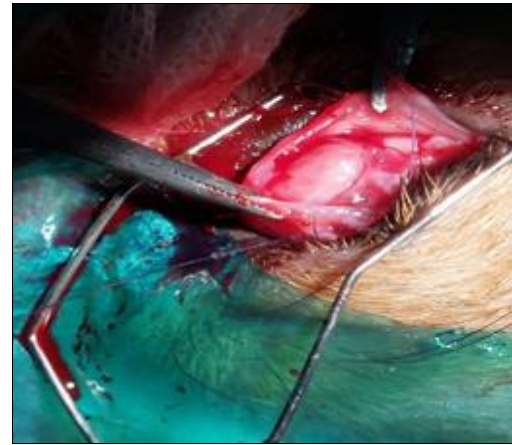


Fig 6: Pocket creation after gently undermining of conjunctiva:

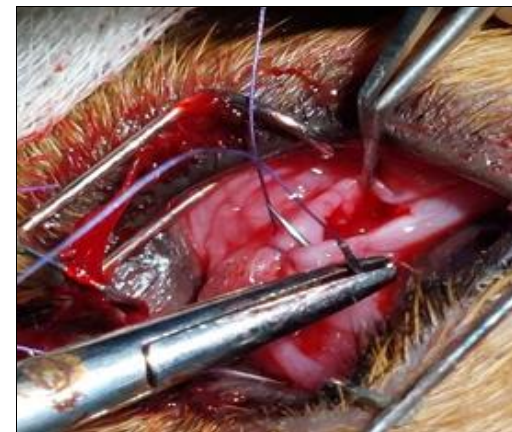


Fig 7: Simple Continuous Layer (First Layer)



Fig 8: Cushioning Pattern (Second Layer)

Group II - Suture anchor placement technique

The surgical replacement of the prolapsed third eyelid gland in six dogs was performed using the Suture anchor placement technique by Sapienza *et al.* (2014)^[17]. The procedure was done under general anesthesia, with the dogs positioned in sternal recumbency. An eyelid speculum was placed, and the third eyelid was exposed using mosquito forceps. A linear incision was made through the conjunctiva over the prolapsed gland with a number 15 scalpel blade and expanded with tenotomy scissors.

The third eyelid cartilage was exposed and a 1-2 mm portion was excised at the base of the gland to increase mobility. The globe was grasped and rotated dorsally, capturing the insertion of the ventral rectus muscle (VRM) with a Gass muscle hook. A 5-0 ethilon suture was threaded through the eyelet of the hook, maneuvered around the VRM insertion,

and passed through the distal part of the gland. A moistened cotton-tipped applicator was used to push the gland into the ventromedial fornix while the suture was tightened and secured with four throws. Secondary and tertiary repairs involved removing scar tissue and retained suture material, followed by gland replacement. If conjunctival perforation occurred during cartilage excision, the palpebral conjunctiva was closed with a 5-0 polyglactin 910 suture in a simple continuous pattern, with knots placed on the anterior aspect of the third eyelid.

Photographs of Suture Anchor Placement Technique (Group II)

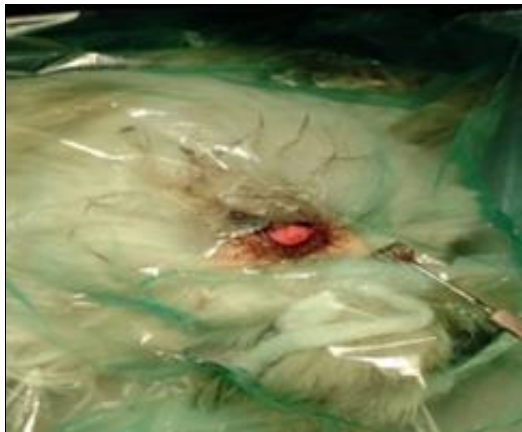


Fig 9: Exposure of palpebral fissure by making slit to drape:



Fig 10: A linear incision is made on conjunctiva over the prolapsed gland from the limbus until the most distal (bulbous) part of prolapsed gland

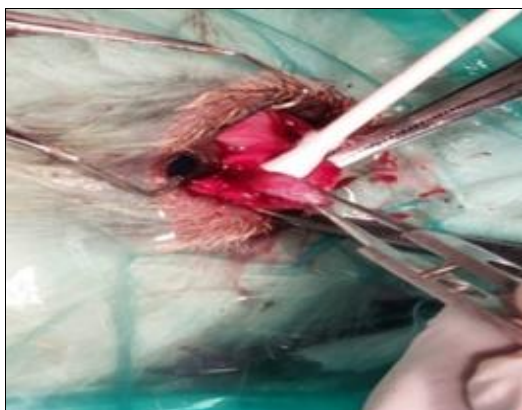


Fig 11: The prolapsed third eyelid gland is more mobile and can be easily put into conjunctival fornix

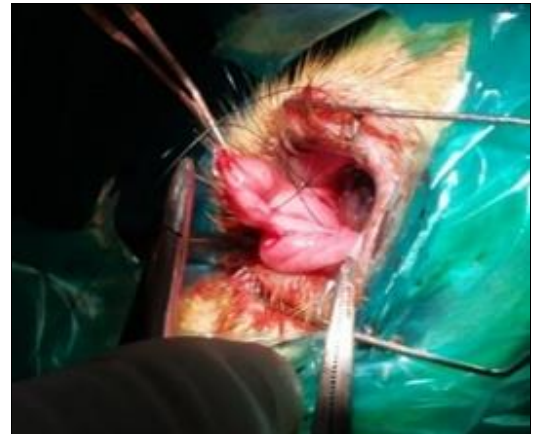


Fig 12: The insertion of the ventral rectus muscle (VRM) is grasped with Gass muscle hook



Fig 13: The suture is passed through the most bulbous distal part of gland



Fig 14: Third eyelid gland was pushed deep into the ventromedial fornix while the ligature is tightened

Post-Operative medications

After surgery, all dogs were required to wear an Elizabethan collar for the first two weeks to prevent self-trauma. A broad-spectrum systemic antibiotic, such as doxycycline, was administered for 5 days, and oral meloxicam was given for 4 days. Additionally, postoperatively, all animals received topical 0.3% ciprofloxacin and flurbiprofen eye drops every 8 hours for 2 weeks. This regimen proved effective during the study period in controlling infection and reducing postoperative inflammation. Premont *et al.* (2012)^[16] advised use of Elizabethan collar for two weeks postoperatively O'Neill *et al.* (2022)^[13] where a predisposition for males was reported. Among the 12 dogs, 10 had third eyelid gland

prolapse cases that were found to be in the age range of 0-12 months, indicating a higher predisposition in dogs below one year of age, this result aligns with the studies conducted by Kavitha *et al.* (2010) [7] and Sowmya (2022) [19]. Among the 12 dogs, the condition was unilateral in 83.33% of dogs, while the rest 16.66% were bilateral indicating more unilateral cases over the bilateral. This was in accordance with Chaudhary *et al.* (2009) [2], Kavitha *et al.* (2010) [7], Kurup (2017) [8] and Sowmya (2022) [19]. In instances of unilateral conditions, the right eye was affected in 6 cases (50%), while the left eye was affected in 4 cases (33.33%), this study aligns with the findings of Oguntayo *et al.* (2022) [14]. During the course of this study, dogs exhibited various clinical signs, including epiphora observed in four cases, conjunctivitis evident in three cases, presence of mucoid or mucopurulent discharge in two cases and consistent presence of cherry-like hypertrophied third eyelid glands originating from the medial canthi of affected eyes in all cases, Similar symptoms were noted by Kurup (2017) [8].

A neuro-ophthalmic examination was conducted before and after surgery in all cases. Out of the 12 cases in the present study, the palpebral, menace, and pupillary light reflexes were positive in all instances. Similar findings were reported by Kurup (2017) [8] in dogs with third eyelid gland prolapse. Post-operatively, all these reflexes remained positive in all 14 cases in the present study

Schirmer tear test values averaged 16.16 ± 1.22 mm/min in group I and 16.16 ± 1.22 mm/min in group II. All pre-operative Schirmer tear test values were within normal limits, consistent with the findings of Cabral *et al.* (2008) [1]. Statistical analysis revealed no significant difference between the two groups, but significant differences were found within each group. On the 1st, 7th, 15th, and 30th post-operative days, the Schirmer tear test values gradually increased in both groups compared to pre-operative values. This is consistent with the findings of Premont *et al.* (2012) [16], Kurup (2017) [8].

and Sowmya (2022) [19]. In this study, all cases tested negative for the fluorescein dye test pre-operatively, suggesting the absence of any defects in the corneal epithelium. This finding is consistent with the observations of Maggs (2013) [8] and Sowmya (2022) [19]. Mean fluorescein passage time was 252.33 ± 4.83 seconds in group I and 240 ± 14.13 seconds in group II, Statistical analysis indicated a significant difference within each group. The fluorescein passage time exhibited a gradual decrease in both groups on the 1st, 7th, 15th, and 30th postoperative days, this was similar to the findings of Kurup (2017) [8].

Clinical Signs

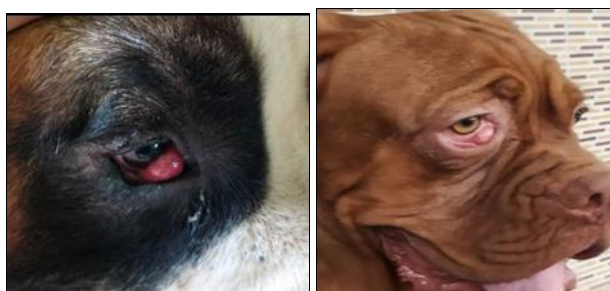


Fig 15: Cherry-like hypertrophied mass from medial canthi:



Fig 16: Conjunctivitis

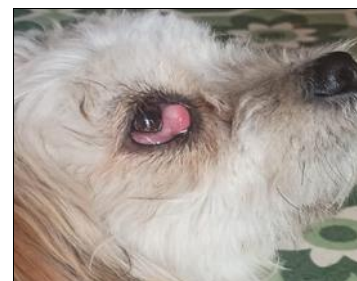


Fig 17: Ocular Discharge



Fig 18: Epiphora

Modified morgan's pocket technique

In the present study, employing a simple continuous suture pattern followed by Cushing suture pattern to secure the pocket incisions around the gland proved to be effective in maintaining the replaced gland within its normal position within the pocket. This technique aligns with the approach utilized by Kurup (2017) [8] and Sowmya (2022) [19]. Out of the 6 operated third eyelid gland, all but one gland remained in its proper position following surgical replacement throughout the length of follow-up. Recurrence of the prolapsed gland was then treated with a suture anchor placement technique and showed uneventful resolution. This finding was contradictory with Kurup (2017) [8] where who reported no recurrence of prolapse of the third eyelid gland after employing Modified Morgan's pocket technique for repositioning of third eyelid gland. However Similar recurrence rate in Modified Morgan's pocket technique was found by Sowmya (2022) [19].



Fig 19: Recurrence after 7 days of Case no. 4 from Group I

Suture Anchor Placement Technique

Animals were selected randomly for this technique and surgery was performed in 6 cases of prolapsed third eyelid gland by Suture anchor placement technique as described by Sapienza *et al.* (2014) ^[17]. All glands remained in its proper position following surgical replacement throughout the length of follow-up. Similar observations were made by Sapienza *et al.* (2014) ^[17] where they reported no recurrence of third eyelid gland prolapse observed in any of the postoperative cases with use of the suture anchoring placement technique.

Duration of surgery

In Group I, the surgical procedure took approximately 23 minutes, while in Group II, it took around 20 minutes. However, the observed difference was found to be statistically non-significant. This outcome aligns with the findings of Chaudhary *et al.* (2009) ^[2], who reported an average duration of 30 minutes for the performance of the modified Morgan's pocket technique.

On the contrary, finding varies with Sapienza *et al.* (2014) ^[17] who documented the mean duration for completion of suture anchor placement technique was 8 min and 46 seconds (range: 3-20 min).

Bleeding

The evaluations of bleeding during surgical procedures are outlined in Table 4.12 Bleeding assessment was conducted by considering the total number of cotton buds used to mop up blood during the surgery. The categorization was as follows:

Mild bleeding - < 3 cotton buds, Moderate bleeding - 3-6 cotton buds, High bleeding - > 6 cotton buds. In group I, 2 cases exhibited moderate bleeding, 3 cases had mild bleeding and 1 case had high bleeding. In group II, 4 cases showed mild bleeding, 2 cases had moderate bleeding.

Time taken to regain normal contour

In Group I, three cases regained normal contour on the 8th postoperative day, while two cases regained normal contour on the 15th postoperative day. In Group II, three cases recovered normal contour by the 8th day after surgery, and three cases achieved normal contour by the 15th postoperative day. The mean duration for the restoration of normal contour was 10 days for Group I and 12 days for Group II.

According to Chaudhary *et al.* (2009) ^[2] eyelids treated with the modified Morgan's pocket technique exhibited a normal appearance within 8 to 10 days.

Conclusion

Based on the results of the present study, it can be concluded that both the Modified Morgan's Pocket technique and Suture Anchor Placement technique were effective in treating third eyelid gland prolapse in dogs. These techniques demonstrated success in repositioning the prolapsed third eyelid gland and improving tear production. However, when considering technical feasibility and duration of surgery, the Suture Anchor Placement technique was considered superior to the Modified Morgan's Pocket technique.



Fig 20: Outcome of Surgery

Acknowledgement

Not available

Author's Contribution

Not available

Conflict of Interest

Not available

Financial Support

Not available

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