

Marsupialization of the Nictitating Membrane Cyst Following Cherry Eye Repair in a Dog

Sunhyo Kim, Seon-mi Kang, Lina Susanti, Boyun Kim, Yoonji Park,
Jaeho Shim, Seokmin Go, Eunji Lee and Kangmoon Seo¹

Department of Veterinary Clinical Sciences, Collage of Veterinary Medicine and Research Institute for Veterinary Science, Seoul National University, Seoul 08826, Korea

(Received: March 31, 2020 / Accepted: June 01, 2020)

Abstract : One-year-old male Cocker Spaniel dog was referred for the third eyelid enlargement and inflammation in the left eye (OS). It gradually swelled for 2 weeks after the cherry eye repair by conjunctival mucosa pocket procedure at a private animal clinic. Routine ophthalmic examinations including neuro-ophthalmic examination, Schirmer tear test, intraocular pressure and corneal fluorescein staining were all normal. No lesions were found on slit lamp biomicroscopy and indirect ophthalmoscopy except for third eyelid swelling in the OS. Ultrasonography revealed cystic structure within the OS nictitating membrane. Fluid from the cyst was aspirated and there were no microorganisms or neoplastic changes. Surgical intervention was performed under general anesthesia. On the day of the surgery, there was a deep corneal ulcer in the OS, which had not existed before. Ventral palpebral surface of the third eyelid was incised horizontally to the shaft of the T-shaped hyaline cartilage. And then, a full thickness of the cystic wall was incised and marsupialized. Additionally, a direct suture was performed on the ulcerated cornea. Topical and systemic antibiotics and anti-inflammatory drugs were prescribed. One month after the surgery, the third eyelid swelling and the discharge were improved. Marsupialization of the nictitating membrane cyst relieved the swelling of the third eyelid and inflammation. It could be a simple but effective surgical intervention for the cystic complication of conjunctival mucosa pocket procedure in dogs.

Key words : cherry eye, conjunctival mucosa pocket procedure, dog, marsupialization, nictitating membrane cyst.

Introduction

The prolapsed of the third eyelid gland, known as cherry eye, occurs commonly in dogs especially in some predisposed breeds such as American Cocker Spaniel, Beagle, Boston Terrier, Pekingese and Shih Tzu (5,7,9). Lymphoid hyperplasia and laxity of the retinaculum that anchors third eyelid to periorbita are proposed etiologic mechanisms for this condition (9).

Secondary conjunctivitis, epiphora, and local irritation are frequently seen because chronic corneal exposure is made (5). Correction of the cherry eye is required but the third eyelid and its gland should not be excised as they contribute to not only precorneal tear film production but also its distribution (4,9). Surgical replacement is the conventional treatment for this condition. Various techniques have been reported to correct the prolapsed third eyelid gland, including anterior or posterior anchoring technique, conjunctival mucosa pocket technique (Morgan's pocket procedure), intranictitans tacking procedure and conjunctival mucosa envelope procedure (5,7).

Conjunctival mucosa pocket technique is one of the most commonly used techniques to replace the cherry eye (10).

However, cyst formation of the third eyelid gland is well known possible complication of this technique (7,9). Up until now there is no established treatment for third eyelid gland cyst secondary to Morgan's pocket procedure (5,6,9). Recently, a series of case report describing marsupialization to correct the cyst secondary to cherry eye surgery showed a favorable result (2). The present case report also describes a third eyelid gland cyst secondary to cherry eye surgery treated with marsupialization and verifies the prognosis. This report also can help to describe the marsupialization technique and to discuss recommendations for the better result.

Case

A 1-year-old, intact male, Cocker Spaniel dog was presented to the Veterinary Medical Teaching Hospital at Seoul National University for the swelling and the inflammation of third eyelid in the left eye (OS). The dog had a cherry eye repair surgery OS 2 months before at the private animal clinic. After 2 weeks from the surgery, the repaired third eyelid has gradually swollen.

A complete ophthalmic examination, including a tear production test (Schirmer tear test®; Intervet, Summit, NJ, USA), neuro-ophthalmic examinations, rebound tonometry (Tonovet®; Icare Oy, Vantaa, Finland), fluorescein staining, slit lamp biomicroscopy (Topcon®-Model SL-D7, Topcon Corp., Tokyo, Japan) and indirect ophthalmoscopy (Vantage®, Keeler Instru-

¹Corresponding author.
E-mail : kmseo@snu.ac.kr



Fig 1. Initial appearance of the left eye. Third eyelid enlargement and conjunctival hyperemia was shown.

ments Inc., Broomall, PA, USA), was performed. Schirmer tear test readings were 18 mm/40 sec OD and 17 mm/min OS. Menace and pupillary light reflex were positive OU. Intraocular pressure were 12 mmHg OD and 17 mmHg OS, respectively. The fluorescein result was negative OU. Slit-lamp biomicroscopy and fundoscopic examination revealed no abnormalities OU except for the third eyelid swelling OS (Fig 1). Ultrasonography was performed on the swollen third eyelid and there was fluid filled cystic lesion. On the cytologic examination through fine needle aspiration (FNA), neutrophilic infiltration was shown and it was suspected to be a cyst with inflammation (Fig 2). There were no infectious agents and neoplastic changes. Surgical intervention of the cyst, marsupialization, was planned. Eighteen days later, on the day of the surgery, deep corneal ulcer was found OS.

After pre-medications with cephazolin (22 mg/kg IV; Cefazolin injection, Chong Kun Dang Pharm, Seoul, Republic of Korea), acepromazine (0.005 mg/kg IV; Sedaject®, Samwoo Medical, Yesan, Republic of Korea), hydromorphone (0.025 mg/kg IV; Dilid®, Hana Pharmaceutical CO. Ltd, Gyeonggi, Republic of Korea) and medetomidine (0.002 mg/kg IV; Domitor®, Zoetis, NJ, USA), general anesthesia was induced with alfaxanone (2 mg/kg IV; alfaxan®, Jurox Pty Ltd., Rutherford, Australia) and maintained with isoflurane (Ifran®, Hana Pharmaceutical CO. Ltd, Gyeonggi, Korea). The dog

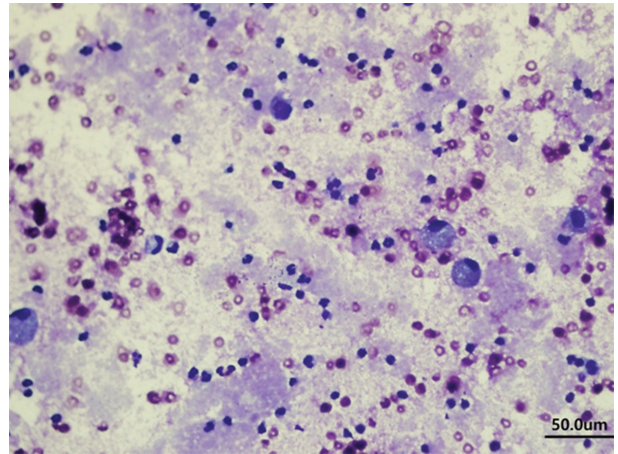


Fig 2. Neutrophils and macrophage infiltrated fluid from the cyst. No findings suspected to infectious agents or neoplastic changes.

was positioned in dorsal recumbency. Surgical region, periorbital tissue, was clipped and aseptically prepared with the 0.5% povidone-iodine. Conjunctival sac was also flushed with 0.9% normal saline and 0.5% diluted povidone-iodine 2 times.

Deep corneal ulcer OS was sutured directly with 8-0 polyglactin 910 (coated Vicryl®, Ethicon, Somerville, New Jersey, USA). After the corneal ulcer repaired, a stay suture of 6-0 polyglactin 910 (coated Vicryl®, Ethicon, Somerville, New Jersey, USA) was placed to manipulate the OS third eyelid. After visualize the palpebral surface of the third eyelid, a linear incision was made with the number 11 scalpel blade. Then, cyst wall was exposed by blunt dissection. A Full thickness of the cyst wall was incised and a piece of the cyst wall was submitted for histopathologic examination. Marsupialization was made by suturing the cyst wall with the adjacent third eyelid conjunctiva (Fig 3a-f). On histopathologic examination cystic structure was not found in submitted tissue.

On the 8th day, sutured ulcer was completely healed and the swelling of the third eyelid OS was mildly decreased (Fig

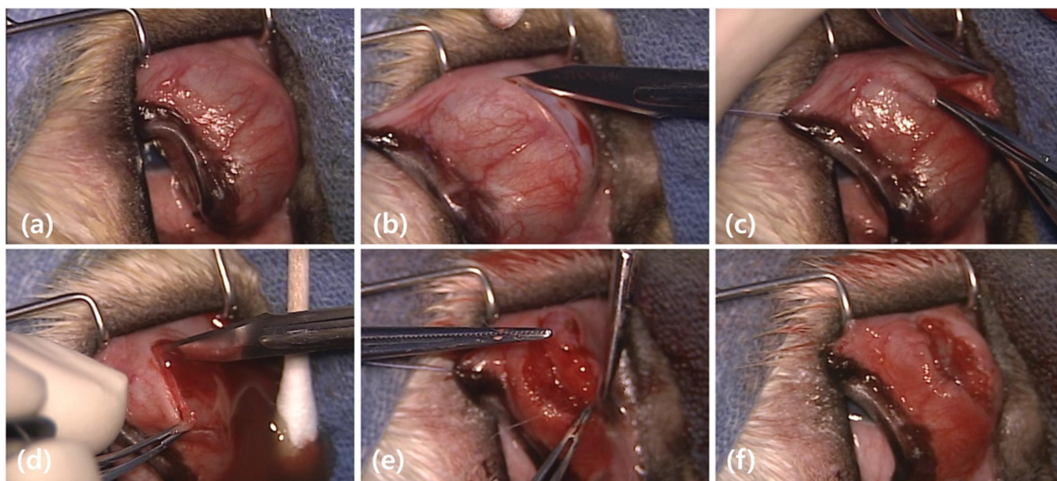


Fig 3. Surgical process of marsupialization on the third eyelid left eye. (a) Exposing palpebral surface of third eyelid. (b) Linear palpebral conjunctival incision. (c) Blunt dissection for visualizing the cyst wall in the third eyelid. (d) Full-thickness stab incision of the cyst wall. Mucous liquid was extravasated from the cyst. (e) and (f) Marsupialization was made by suturing the cyst wall with its adjacent incised conjunctiva.

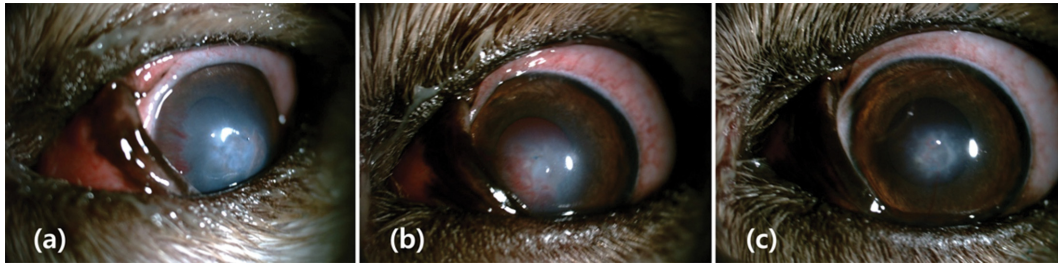


Fig 4. Postoperative photographs of the left eye. (a) Sutured ulcer was well healed and third eyelid swelling decreased mildly on the 8 days from surgery. (b) More improved third eye lid swelling on 22 days from surgery. (c) Significant recovery of third eyelid and no recurrence of cyst on 36 days from surgery.

Table 1. Pre- and post-operative STT values

		Preoperative	3 days	8 days	22 days	36 days
STT value	OD	18 (17 s)	11	22	13	21
(mm/min)	OS	17	15	14	12	15

STT; Schirmir tear test, OD; right eye, OS; left eye, s; seconds.

4a). On the 22th day, ophthalmic examination revealed less swelling on the marsupialized third eyelid (Fig 4b), though there was some mucopurulent ocular discharge. On the 36th day, there was significant recovery of the third eyelid swelling and no evidence of cyst recurrence (Fig 4c). Pre- and post-operative STT values were almost within normal range (Table 1). Ophthalmic examinations including STT, IOP, slit lamp biomicroscopy fluorescein staining, and fundus examination were all normal. However, mild conjunctival hyperemia OS was still remained and small stricture on the medial surface of the marsupialized site in third eyelid mucosa was found. Follow-up assessment by phone was carried out until the period of 6 months from the surgery. The owner reported the swelling of the OS third eyelid was continuously decreased and no additional problems were observed.

Discussion

This report described marsupialization OU the palpebral surface of the third eyelid for the treatment of cyst secondary to cherry eye repair surgery with a successful outcome for the six months follow up period. Prolapsed third eyelid gland is one of the most common primary disease of the nictitate membrane in dogs (6). Protrusion of the third eyelid becomes enlarged, inflamed and infected because the exposed conjunctiva dries consistently (6,9). Conventional treatment for the cherry eye is surgical repair. The Morgan's pocket technique may be the most commonly used procedure because it is the easiest methods to learn and the success rate is high (94%) (6,10,11). However, the formation of cyst in the third eyelid is a possible complication after the surgery (6).

The openings of third eyelid gland duct are located OU the bulbar surface of nictitate membrane between subepithelial lymphoid nodules (10). Though there was a previous study that showed pocket technique does not disturb the excretory ducts of third eyelid lacrimal gland, if the elliptical incisions are connected, it will obstruct the tear's out flow (6,10). Sim-

ple drainage can reduce the size of cyst but only palliative. Some published reports suggested the surgical removal of cyst was curative in cases of dacryops, similar in also conjunctival cyst (6,8,12). However, resection of the cyst can influence aqueous tear secretion relative to the size of the gland being removed (6,8,12). In human medicine, several studies applied marsupialization on the various origin of lacrimal cyst and the result was safe and effective (1,13,14). In the recent report, Morgan's pocket technique induced lacrimal cyst on the nictitate membrane and was repaired with marsupialization in three dogs with the longest follow-up time of 2 years (2). The present case also showed reduced inflammation, satisfactory cosmetic results and no notable complication for 6 months after the surgery.

Some literatures classified the origin of lacrimal cysts by histological characteristics and immunohistochemical staining (3,12). In the present report, further examination for classifying the cyst by its origin is not pursued. In the histopathologic examination result of this case, cystic structure was not found. This was possibly due to too small size of the sample from the lesion. Nevertheless, it was still considered as the cystic complication after surgery based on the medical history, ultrasonographic and cytologic examination.

Third eyelid tubuloacinar lacrimal gland is one of the major sources of aqueous tear secretion in dogs (6). In the previous report, the patients that have lacrimal cyst after cherry eye repair surgery showed decreased STT of 15.8-47.6% compared to the fellow eye likely due to confinement of tears (2). However, there were no changes in STT values before and after marsupialization in this case. Marsupialization is considered improving the tear production and not influence the normal tear secretion in some cases (2). Large number of cases and long periods of follow-up would be also required for better study.

Conclusion

In this case, marsupialization on the third eyelid cyst sec-

ondary to cherry eye repair surgery relieved the third eyelid inflammation and swelling. No evidence of discomfort and recurrence were observed for 6 months follow-up period. In conclusion, marsupialization is a simple and effective surgical intervention and is applicable to patient with cystic complication from conjunctival mucosa pocket technique in dogs.

Acknowledgment

This study was supported through BK21 PLUS Program for Creative Veterinary Science Research and the Research Institute for Veterinary Science (RIVS) of Seoul National University, Korea.

References

1. Ali MJ, Psaltis AJ, Brunworth J, Naik MN, Wormald PJ. Congenital dacryocoele with large intranasal cyst: efficacy of cruciate marsupialization, adjunctive procedures, and outcomes. *Ophthalmic Plast Reconstr Surg* 2014; 30: 346-351.
2. Barbé C, Raymond-Letron I, Mias GP, Charron J, Goulle F. Marsupialization of a cyst of the nictitating membrane in three dogs. *Vet Ophthalmol* 2017; 20: 181-188.
3. Dubielzig R, Ketring K, McLellan G, Albert D. Diseases of the orbit: cystic lesions of the orbit. In: *Veterinary Ocular Pathology*. Philadelphia: Elsevier-Saunders. 2010: 123-126.
4. Dugan SJ, Severin GA, Hungerford LL, Whiteley HE, Roberts SM. Clinical and histologic evaluation of the prolapsed third eyelid gland in dogs. *J Am Vet Med Assoc* 1992; 201: 1861-1867.
5. Gelatt K, Gelatt J. Surgical procedures for the conjunctiva and the nictitating membrane. In: *Veterinary Ophthalmic Surgery*, 1st ed. Maryland Height: Elsevier-Saunders. 2011: 157-190.
6. Gelatt K, Gilger B, Kern T. Diseases and surgery of the canine lacrimal secretory system. In: *Veterinary Ophthalmology*, 5th ed. Ames: John Wiley & Sons. 2013: 922-965.
7. Gould D, McLellan G. The conjunctiva and third eyelid. In: *BSAVA Manual of Canine and Feline Ophthalmology*, 3rd ed. Quedgeley: British Small Animal Veterinary Association. 2014: 182-199.
8. Lamagna B, Peruccio C, Guardascione A, Paciello O, Costagliola A, Giudice C, Rondena M, Saccone M, Uccello V, Lamagna F. Conjunctival dacryops in two golden retrievers. *Vet Ophthalmol* 2012; 15: 194-199.
9. Maggs D, Miller P, Ofri R. Diseases of the conjunctiva. In: *Slatter's Fundamentals of Veterinary Ophthalmology*, 6th ed. St. Louis: Elsevier Health Sciences. 2018: 178-185.
10. Moore C, Frappier B, Linton L. Distribution and course of ducts of the canine third eyelid gland: effects of two surgical replacement techniques. *Veterinary and comparative ophthalmology (USA)* 1996.
11. Morgan R, Duddy J, McClurg K. Prolapse of the gland of the third eyelid in dogs: a retrospective study of 89 cases (1980 to 1990). *The Journal of the American Animal Hospital Association (USA)* 1993.
12. Ota J, Pearce J, Finn M, Johnson G, Giuliano E. Dacryops (lacrimal cyst) in three young labrador retrievers. *J Am Anim Hosp Assoc* 2009; 45: 191-196.
13. Salam A, Barrett A, Malhotra R, Olver J. Marsupialization for lacrimal ductular cysts (dacryops): a case series. *Ophthalmic Plast Reconstr Surg* 2012; 28: 57-62.
14. Yoon M, Jakobiec F, Mendoza P. Canaliculops: clinicopathologic features and treatment with marsupialization. *Am J Ophthalmol* 2013; 156: 1062-1068.