

Evaluation of Morgan's pocket technique in the treatment of nictitans gland prolapse in dogs

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Abstract: Nictitans gland prolapse (NGP), also known as third eyelid gland prolapse or cherry eye disease, is an important eye problem that should be treated as soon as possible in dogs. Although many surgical methods have been described, there is no consensus on the most effective technique. In this study, it was aimed to evaluate the characteristics of cases and clinical outcomes of Morgan's pocket technique in the treatment of dogs with NGP. In this context, the characteristics of the cases were examined in 25 dogs diagnosed (29 eyes) with NGP. Clinical results, recurrence, and complications were evaluated in 17 dogs (20 eyes) who underwent surgical treatment with Morgan's pocket technique. The most common breeds were Terrier (28%) with 7 cases and Cane corso (20%) with 5 cases. Most of the patients were male (56%) by sex and less than 1 year (66%) by age. The disease was diagnosed in the acute stage in 9 cases (36%) and in the chronic stage of 16 cases (64%). The success rate of 17 patients (20 eyes) without recurrence was 94.12% (16 cases). The recurrence rate was 5.88% and the complication rate was 5.88%. In conclusion, it is advantageous to use Morgan's pocket technique in NGP cases in dogs because of its easy applicability and high success rate. Due to the low recurrence and complication rates, its reliability is high.

Key words: Glandula nictitans, third eyelid gland, cherry eye, dog, pocket technique

1. Introduction

Protrusion of the third eyelid gland from the medial canthus of the eye is called nictitans gland prolapse (NGP), third eyelid gland prolapse, or cherry eye disease that characterized by glandular expression, hyperaemia and increased gland volume [1,2]. It is usually seen in younger dogs (<1-year age), but can occur at any age and may be unilateral or bilateral [3–6]. Breeds with NGP predisposition reported include Cocker Spaniel, Boston terrier, Bulldog, Pekingese, Neapolitan mastiff, Beagle, Cane corso, Lhasa apso, Shih-tzu, and Basset hound [3,4,6]. It is one of the most common diseases affecting ocular attachments [7]. The pathophysiology of the disease is explained by genetic predisposition and poor development of connective tissue between the base of the gland and periorbital tissue [8–11]. Also, antigen stimulation and growth of the gland have been reported to be effective in pathophysiology [4,12]. The eye usually has a persistent inflammatory reaction and may cause dry eye. The only effective treatment is surgery [5]. In a recent review of the surgical treatment of NGP, it was reported that surgical success and outcomes could not be fully evaluated due to insufficient data [2]. The aim of this study was to evaluate the disease findings and the results of surgical treatment with Morgan's pocket technique in dogs with nictitans gland prolapse (NGP).

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2. Materials and methods

Disease and prognosis data of 25 dogs diagnosed with nictitans gland prolapse (NGP) were evaluated. Breed, sex, age, prolapse duration, stage of the disease, affected eyes, clinical findings, results of surgical treatment, and postoperative complications were noted. The patients were evaluated in 3 groups as age; younger than 1 year, 1–7 years and above 7 years. The disease stage was determined as acute for 0–14 days and chronic if 15 days or more. In addition to clinical examination, fluorescein staining method was used to determine the possible corneal damages concurrently with NGP. The use of Morgan's pocket technique in the replacement of nictitans gland prolapsed in 14 unilateral and 3 bilateral cases (20 eyes) was evaluated in 17 dogs that the patients accepted surgical treatment [13].

In order to provide perioperative effect, it was performed amoxicillin-clavulanic acid combination (8–9 mg/kg SC, Synulox, Pfizer, Turkey) as antibiotic, and metamizole sodium (10–25 mg/kg IV, Gergaline-G, Münir Şahin, Turkey) for analgesia. For general anaesthesia, premedication was provided with xylazine hydrochloride (1–2 mg/kg IM, Basilazin, Bavet, Turkey), and induction with ketamine hydrochloride (10–20 mg/kg IM, Ketazol, Interhas, Turkey). Endotracheal intubation was performed

and anaesthesia was maintained with sevoflurane (2–3% inhalation, Sevofrane, Abbott, U.K.) or isoflurane (1–3% inhalation, Isoflurane-USP, Piramal Critical Care Inc, USA) in O₂. For the surgical procedure, the ventral recumbency position or in some cases lateral recumbency position (with the side to be intervened above) was preferred. Povidone-iodine (10%) solution was applied to periocular skin. Corneal and conjunctival surfaces were cleaned and irrigated with saline. The area around the eye was covered with a disposable sterile surgical drape, and an eye speculum was placed to open the eyelids. The third eyelid was pulled out to provide better surgical access to the nictitans gland. Two incisions were made on the bulbar conjunctiva of the third eyelid, on both (anterior and posterior) sides of the prolapsed gland and slightly curved, as described in the Morgan's pocket technique [13–14]. After the gland was pushed into its anatomical position, the reposition was fixed by simple continuous suture with the starting and ending nodes on the anterior surface of the third eyelid and 1–2 mm from the gland. Polyglycolic acid (P.G.A, Çetin Kimya, Turkey) 3/0 or 4/0 was preferred

for sutures. Important stages of the procedure performed in one case and pre/postoperative images are presented as an example in Figure 1(a–f).

Postoperatively, acid boric (2%) solution for local cleaning and marbofloxacin (0.5%) ophthalmic solution (Vigamox, Alcon Lab., U.S.A.) eye drops as local antibiotic (3 x 3 drops for 7–14 days) were administered. Amoxicillin-clavulanic acid combination (8–9 mg/kg SC, Synulox, Pfizer, Turkey) was used as systemic antibiotic, and carprofen (2–4 mg/kg PO, Rimadyl, Zoetis, U.S.A.) was used as antiinflammatory. Because of possible interaction with suture line wound healing, local corticosteroid was not used postoperatively. The patients were followed for at least 1 month, and the longest duration of follow up was 4 years.

3. Results

Physical examinations revealed a reddish mass (nictitans gland) located behind the third eyelid near the medial canthus, local irritation, conjunctivitis, and epiphora. No damage was detected in the fluorescein staining, such as

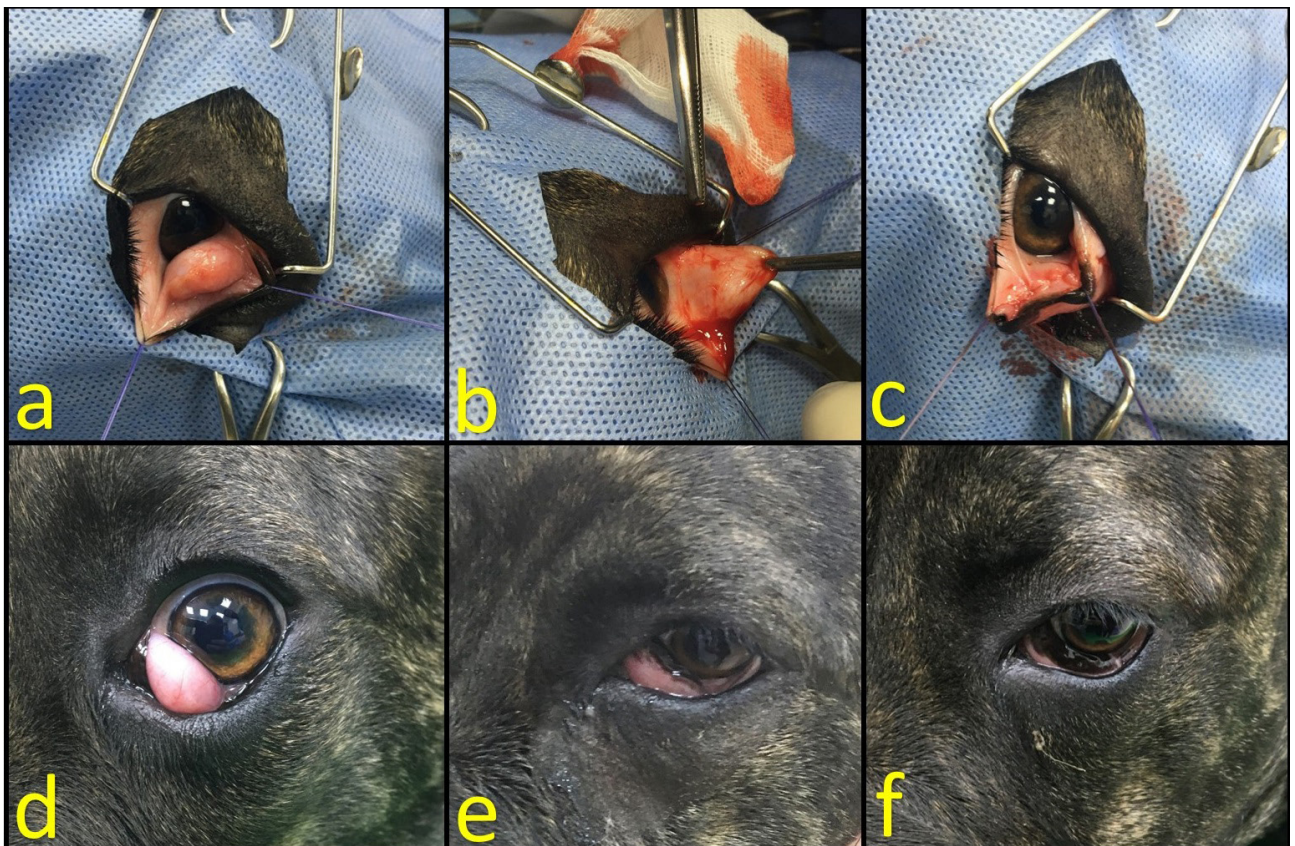


Figure 1. Intraoperative procedures of Morgan's pocket technique and pre/postoperative appearance: a) pulling out the third eyelid with sutures for better surgical access, b) making 2 parallel and slightly curved incisions through the bulbar conjunctiva anterior and posterior to the prolapsed gland, c) repositioning and fixing of the gland using a single-layer simple continuous suture pattern, d) before surgery, e) immediately after surgery, f) postoperative (1st month).

Table 1. Summary of signalment, disease, and treatment information of cases.

| No | Breed | Sex | Age | Time (days) | Stage | Side | Surgical treatment | Prognosis |
|----|------------------|-----|-----|-------------|---------|-----------|--------------------|------------|
| 1 | Border collie | M | 5 | 21 | Chronic | Left | Rejected | Unknown |
| 2 | Terrier | M | 18 | 28 | Chronic | Left | Operated | Good |
| 3 | Mixed | M | 0.7 | 25 | Chronic | Right | Rejected | Unknown |
| 4 | Terrier | F | 0.3 | 45 | Chronic | Right | Operated | Good |
| 5 | Cocker spaniel | F | 0.4 | 10 | Acute | Right | Operated | Good |
| 6 | Cane corso | F | 0.2 | 30 | Chronic | Right | Operated | Good |
| 7 | Terrier | F | 0.2 | 21 | Chronic | Left | Rejected | Unknown |
| 8 | Terrier | M | 0.6 | 9 | Acute | Right | Operated | Good |
| 9 | Cane corso | F | 0.4 | 12 | Acute | Left | Operated | Good |
| 10 | Golden retriever | F | 0.7 | 15 | Chronic | Right | Rejected | Unknown |
| 11 | Terrier | F | 1 | 15 | Chronic | Right | Operated | Good |
| 12 | Cane corso | M | 2 | 20 | Chronic | Left | Rejected | Unknown |
| 13 | Terrier | M | 8 | 15 | Chronic | Left | Rejected | Unknown |
| 14 | Cocker spaniel | M | 0.4 | 5 | Acute | Left | Operated | Good |
| 15 | Pointer | M | 0.8 | 20 | Chronic | Right | Operated | Good |
| 16 | French bulldog | M | 2 | 45 | Chronic | Bilateral | Operated | Good |
| 17 | Terrier | F | 0.8 | 10 | Acute | Left | Rejected | Unknown |
| 18 | Mixed | M | 2 | 30 | Chronic | Right | Operated | Good |
| 19 | Mixed | F | 0.1 | 15 | Chronic | Right | Operated | Good |
| 20 | Rottweiler | M | 2 | 14 | Acute | Bilateral | Rejected | Unknown |
| 21 | Beagle | M | 0.4 | 10 | Acute | Right | Operated | Good |
| 22 | Golden retriever | F | 0.8 | 14 | Acute | Bilateral | Operated | Recurrence |
| 23 | Cane corso | M | 0.5 | 30 | Chronic | Left | Operated | Epiphora |
| 24 | Cane corso | M | 0.5 | 5 | Acute | Bilateral | Operated | Good |
| 25 | Rottweiler | F | 2 | 15 | Chronic | Left | Operated | Good |

corneal trauma or ulcer. Complete blood count tests were generally normal and did not reveal any specific findings. The most common breeds in 25 dogs with NGP were Terrier (28%) with 7 cases and Cane corso (20%) with 5 cases. Information about the signalment, diagnosis, and treatment results of the cases are summarized in Table 1. The number and percentage of cases by breeds are presented in Table 2. The sex distribution of the patients was 14 male (56%) and 11 female (44%). In the age distribution of the patients, 16 dogs (64%) were younger than 1 year, 7 dogs (28%) were 1–7 years, and 2 dogs (8%) were older than 7 years (range 0.1–18, mean 2, and median 0.7). The disease was bilateral in 4 cases (16%) and unilateral in 21 cases (84%). Of the cases diagnosed with unilateral NGP, 11 (52.38%) were on the right and 10 (47.62%) were on the left. The time from the day of NGP to the surgery was recorded as 5–45 days (mean 19.33 days, median 15 days). In the disease stage evaluation, 9 (36%) cases were acute

and 16 (64%) cases were chronic. Of these, 17 patients who underwent surgery (20 eyes) had a success rate of 94.12% (16 cases) without recurrence. In a bilateral and chronic case, the left nictitans gland re prolapsed on the 10th day, and the right gland of the same case re prolapsed after 1 month postoperatively. Only 1 patient had long (more than 2 months) postoperative epiphora, as a complication. The individual and categorical information of the cases are presented in Tables 1 and 3. Before and after surgery images of 2 cases are shown in Figures 2 and 3.

4. Discussion

In some studies, NGP was more common in male dogs and considered as more susceptible [3,15,16]. However, some researchers have not found sex predisposition [13,17–20]. NGP cases in our study have consisted of 14 males and 11 females. Therefore, it is consistent with studies reporting that NGP is more common in male dogs.

Table 2. Breed distribution in dogs with NGP.

| Breed | Frequency | Percentage (%) |
|------------------|-----------|----------------|
| Terrier | 7 | 28 |
| Cane corso | 5 | 20 |
| Mixed | 3 | 12 |
| Cocker spaniel | 2 | 8 |
| Golden retriever | 2 | 8 |
| Rottweiler | 2 | 8 |
| Pointer | 1 | 4 |
| Border collie | 1 | 4 |
| Beagle | 1 | 4 |
| French Bulldog | 1 | 4 |

The age distribution of the patients was also consistent with other studies as the majority of dogs (66.67%) were <1 year old [3,13,15]. Breed distribution of dogs in our study is consistent with previous studies with the majority of breeds such as Terrier and Cane corso, which are predisposed to NGP [13,15,17,18].

Medical treatment or conservative local therapies including antibiotic and steroid combination in NGP is not indicated as a solution [2,5,21]. It has been stated in the studies that surgery is the best option in the treatment of NGP [2,5,22]. Postoperative use of topical corticosteroids is recommended in some studies but also discouraged in some [23, 24]. It is still controversial due to its undesirable effects such as delay in incisional healing and resulting in higher failure rates [24]. Without repositioning and fixing,

Table 3. Summary of categorical information of NGP cases.

| Information | n = 24 (dogs) | Percentage (%) |
|------------------|---------------|----------------|
| Male | 14 | 56 |
| Female | 11 | 44 |
| Acute | 8 | 32 |
| Chronic | 17 | 68 |
| Age<1 | 16 | 64 |
| Age 1-7 | 7 | 28 |
| Age>7 | 2 | 8 |
| Unilateral right | 11 | 44 |
| Unilateral left | 10 | 40 |
| Unilateral (all) | 21 | 84 |
| Bilateral | 4 | 16 |
| Operated | 17 | 68 |
| Rejected | 8 | 32 |

the gland tissue remains open to various pathologies, and inflammation and irritation persist. Removal of the gland may cause tear secretion to be reduced by up to 40% and secondary keratoconjunctivitis sicca (dry eye disease) formation. Therefore, partial or complete removal of the gland should not be preferred [2,15,22,26]. Most of the breeds identified to be predisposed to NGP have also been reported to be predisposed to dry eye disease, but there is no defined relationship between these 2 diseases [27]. Due to the simplicity of the technique, some researchers have tried the treatment by removing the gland [17,28]. However, surgical repositioning techniques are more



Figure 2. In a Beagle (case 21) with acute unilateral NGP: a) before surgery, b) postoperative (2nd month).

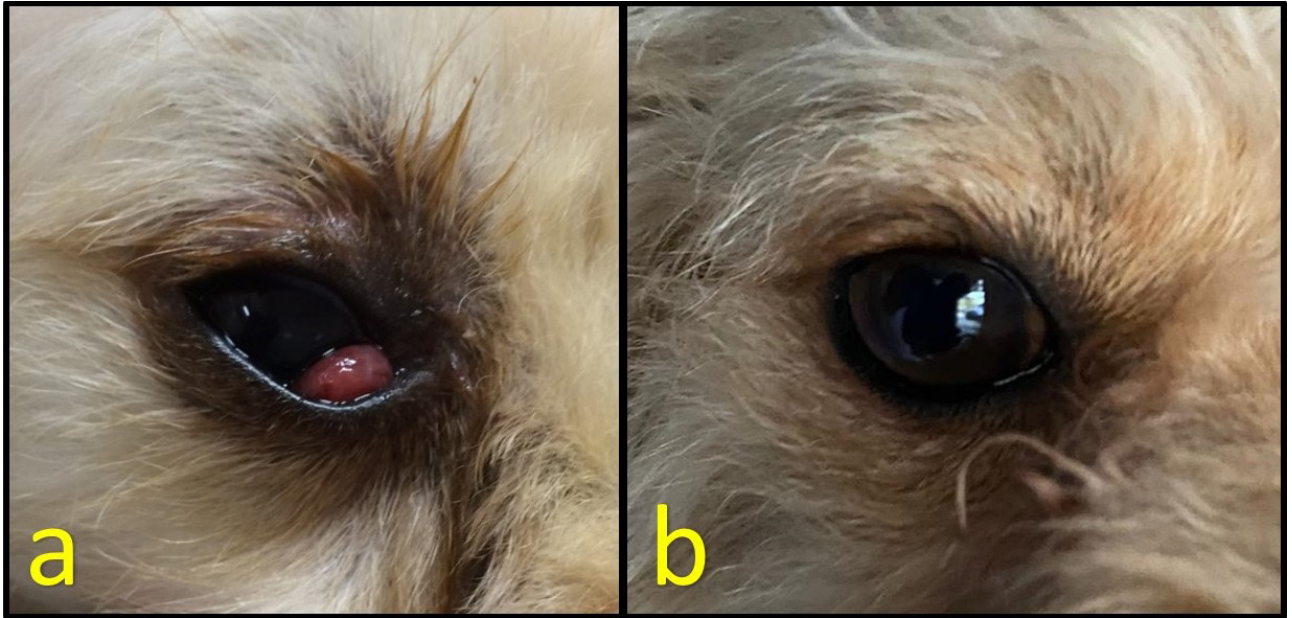


Figure 3. In a Terrier (case 4) with chronic unilateral NGP: a) before surgery, b) postoperative (6th month).

successful than gland removal, and fewer complications are seen (2,17,23). In particular, as the breeds with the inherited predisposition to NGP are also predisposed to dry eye disease, this risk cannot be ruled out [22,23,29]. In this context, repositioning and fixation of the gland is the most appropriate choice in surgical treatment [2,23,30].

Several surgical techniques have been described for the reposition and fixation of the NGP in dogs [2,14,23]. These techniques can be considered in 2 groups as pulling it into anatomical position with sutures or embedding the gland by forming a pocket. Moore and Morgan have described techniques that aim to embed the gland by creating a pocket [8,18]. The techniques aimed at pulling the gland through stitches are those described by Blogg, Gross, Albert, Kaswan-Martin, and Martin-Stanley [23,31–35]. However, there is no consensus on the most effective technique [2]. The preferred surgical technique in treatment depends mostly on personal preference [36]. The advantages of Morgan's pocket method are that it is a less risky, easy-to-learn and easy applied technique. Studies have reported no undesirable results [2,15,16]. However, decreased mobility of the third eyelid has rarely been reported [18]. This is a more common outcome in dogs with excision of the gland. Deghan et al. reported that in 28 dogs, 1 recurrence, 2 corneal ulcers, 1 epiphora and mucopurulent discharge were formed as a result of a similar surgical method [15]. Sağlıyan and Günay reported 1 recurrence in 18 cases [16]. In a recent comprehensive review of studies involving techniques in the treatment of NGP in dogs, surgical failure (reprolapse) was reported

in nearly all studies. Additionally, the overall failure rate was stated as 3% (1%–7%) for Morgan's pocket procedure and the least among other techniques [2]. In our study, it was determined that the recurrence of a patient with bilateral NGP was caused by the failure of the animal owner to administer postoperative medications despite the chronic stage of the disease. Recurrence is an expected result due to the absence of postoperative medications in addition to the damage and pathological changes in the gland caused by the chronicization of the disease. Most common reported complication was corneal ulceration. Third eyelid elevation, gland prominence lacrimal cyst, and postoperative cartilage eversion were reported rarely [2]. In our study, only 1 case of epiphora was seen as a complication. In different studies using Morgan's pocket technique, single-layer or 2-layer sutures were used to fix the gland reposition and various sutures of 3/0–7/0 thickness were used [2,14]. In our study, a single layer of the simple continuous suture with 3/0–4/0 thickness absorbable suture material was found appropriate. It is thought that the second layer suture does not need to be used routinely, but it can be used in very chronic cases that there are many inflammatory changes in the gland and surrounding area and there is a high risk of recurrence.

Excision of the nictitans gland leads to a reduction in tear production [37]. It is important that the pocket method does not cause a reduction in tear production and does not damage the channels of the nictitans gland. It is also easy to learn and apply. For this reason, it is recommended to be preferred [2,7,36]. The fact that the

success of surgical treatment in our study was 94.12% and the recurrence of only 1 case supported the applicability and success rate of Morgan's pocket technique. In achieving these successful results; it was found important to perform the procedures of the surgical method meticulously, thus, avoiding iatrogenic damage to the nictitans gland, the T cartilage, and conjunctival tissues. It was also beneficial to use the right suture material and 1-layer continuous suture method to minimize postoperative inflammation. It was stated that veterinary surgical studies about NGP treatment will improve evidence assessment, as well as reduce possible reasons for bias [2].

In conclusion, it is advantageous to use Morgan's pocket technique in NGP cases in dogs because of its easy applicability and high success rate. Due to the low recurrence and complications, its reliability is high.

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