



CASE REPORT

Evaluation of a Slightly Modified Arrowhead Procedure for Lateral Canthal Entropion Repair in Four Chow Chow Dogs

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ABSTRACT

The aim of this study was to investigate typical entropions on the lateral canthus of Chow Chow dogs and evaluate the outcome of a slightly modified arrowhead procedure to correct the entropion. Four Chow Chow dogs (mean age, 4.42 ± 4.35 years; 6 eyes total) diagnosed with a lateral canthal entropion underwent the slightly modified arrowhead procedure. The modified procedure involves a longer incision nasally and another incision close to the eyelid margin. Two dogs had a unilateral entropion in their left eye, and the other 2 had bilateral entropions. A corneal ulcer was found in 2 eyes of 2 dogs, and the other eyes had keratitis with neovascularization. After eyelid surgery, all four dogs recovered well with no complications. The cornea healed with antibiotic eye drops alone. A follow-up examination three years later revealed that these dogs have had no further eye problems. The slightly modified arrowhead procedure for lateral canthal entropion repair in Chow Chow dogs was successful, and the dogs did not require any further treatments for this condition. Overall, there were no complications related to this technique.

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INTRODUCTION

Entropion, defined as an inversion of the eyelid margin, is a common ocular disorder in dogs (Read and Broun, 2007; Williams and Kim, 2009). Entropions irritate the eye as the lashes may now touch the cornea or sclera (White *et al.*, 2012). Because of this, several secondary ocular problems arise including, epiphora, mucoid discharge, conjunctival hyperemia, blepharospasm excoriation, alopecia, and corneal ulcers (Read and Broun, 2007).

Most primary entropions are breed related and inherited (Turner, 2008). Developmental entropions typically occur during growth (Read and Broun, 2007). Dog breeds that commonly exhibit developmental entropions include the Spaniel, Retriever, Hound, Mastiff, and other giant breeds, in addition to specific breeds, such as the Rottweiler, Bulldog, Chow Chow, and Shar Pei (Read and Broun, 2007; van der Woerdt, 2004).

Both entropions and trichiasis can cause serious eye problems in chow chows. Because Chow Chows have an abundance of facial wrinkles and a very large head, upper and lower eyelid trichiasis and typical lateral canthal entropion occur frequently in this breed (van der Woerdt, 2004).

There are many Chow Chows with lateral canthal entropions (Read and Broun, 2007). This type of entropion commonly occurs in large-headed breeds such as the Rotweiller. On first examination, it may appear to be a straightforward lower lid entropion; however, this breed, and others with similar anatomy, frequently develops intense blepharospasm, resulting in corneal ulceration in the ventrolateral quadrant (Turner, 2008). This disease is commonly treated with the arrowhead procedure (Moore and Constantinescu, 1997), but there are some entropions for which this procedure is not effective. To treat these, we adapted a modification of the Hotz-Celsus method to treat lateral canthal entropions in Chow Chows (Roberston and Roberts, 1995). In this study, we investigated a typical entropion on the lateral canthus of Chow Chow dogs and evaluated the outcome of a slightly modified arrowhead procedure.

MATERIALS AND METHODS

Four Chow Chows (6 eyes total) were diagnosed with lateral canthal entropions. These dogs were treated with the slightly modified arrowhead procedure under general

anesthesia, as described below: The general arrowhead procedure adapted for correction of lateral entropion is shown in Figure 1 (Fig.1, A, ①). The incision line was lengthened medially from the end of the arrowhead for correction of the upper and lower eyelid entropion (Fig.1, A, ②③). The second incision was determined by the length and shape of the entropion (Fig.1, B, ④⑤). The remaining strip of eyelid skin and orbicularis oculi muscle were removed using tenotomy scissors. Subsequently, the surgical wound was closed by 6-0 simple interrupted non-absorbable sutures (Dafilon®, Polyamide monofilament, B. Braun Surgical SA, Rubi, Sapin; Fig. 2). After surgery, oral antibiotic (cephalexin, 30 mg/kg) and anti-inflammatory (metacam, 0.1 mg/kg) medications were prescribed. In addition, a local antibiotic (Terramycin® ointment) was also used. Suture materials were removed 10 days after surgery.

RESULTS

The average age of the patient was 4.42 ± 4.35 years. All effected eyes had a lateral canthal entropion and upper and lower eyelid entropion (Fig. 3). Two dogs (two eyes) had corneal ulcers (Fig. 4. case 1. left eye, case 3. left eye). The other eyes had keratitis with neovascularization. This two-step procedure is easier than existing methods for determining how much skin needs to be removed to correct the entropion. After surgery, all dogs recovered well without any complications. All of their corneas also recovered well without any further treatment (Fig. 5) after the antibiotic eyedrops (effexine®, ofloxacin, Ildong Pharmaceuticals Co. Ltd., Korea).

DISCUSSION

To correct a lateral canthal entropion in Chow Chows, many surgical procedures have been adapted (McCallum and Welser, 2004; Ionaşcu *et al.*, 2013). For a severe entropion in Chow Chows, rhytidectomy is often used, but this procedure is quite invasive, therefore a modified Hotz–Celsus procedure in an arrowhead shape is generally preferred for correcting Chow Chow lateral

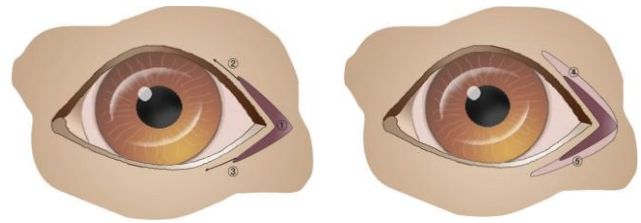


Fig. 1: Schematic diagram of the slightly modified arrowhead procedure. A. the first step of modified arrowhead procedure. ① Arrowhead shape incision, ②③ medial incision lengthening for correction of upper and lower eyelid entropion B. the second step of Modified arrowhead procedure. ④⑤ the determining incision line by length and shape of the entropion.

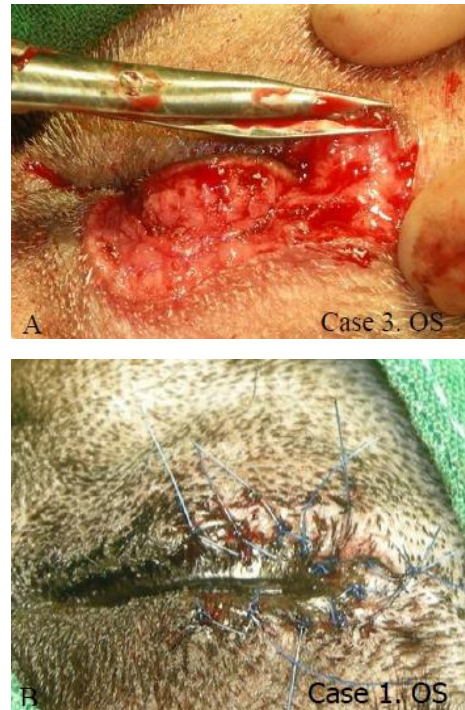


Fig. 2: Slightly modified arrowhead procedure. A. picture taken during the operation, Removing of the remaining strip of eyelid skin and orbicularis oculi muscles. B. immediate postoperative appearance. The surgical wound was closed by 6-0 simple interrupted non-absorbable sutures.



Fig. 3: Lateral canthal entropion pre-operation pictures (OD - right eye, OS - left eye).

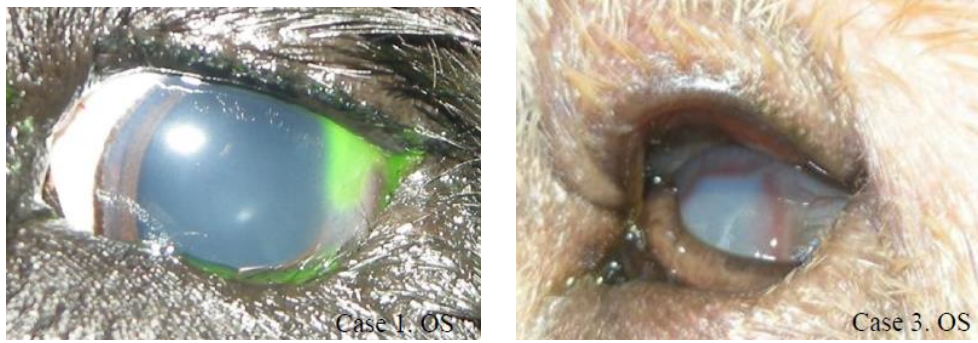


Fig. 4: Corneal ulcers resulting from lateral canthal entropions (OS - left eye).

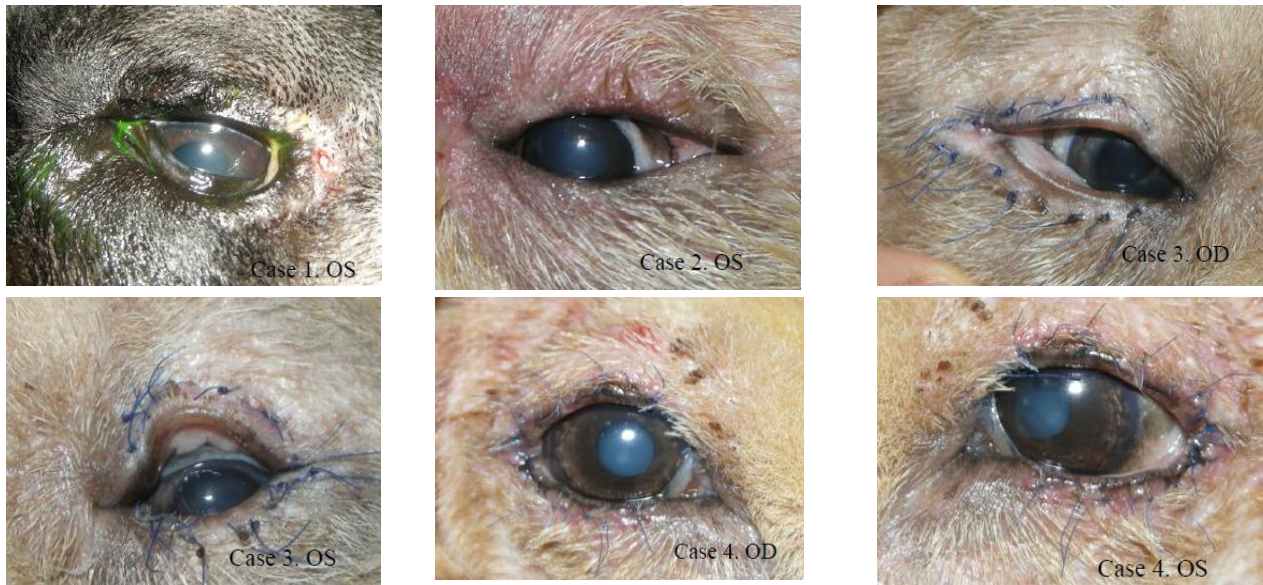


Fig. 5: Results of modified arrowhead procedure; post-operative pictures. (OD - right eye, OS - left eye).

entropion (Steinmetz, 2015). This procedure involves pulling out the canthal skin and reduces the involution (Turner, 2008). However, this procedure is not effective in some patients; sometimes, lateral ligament resection is required. Once the ligament is transected, the canthus is released and the eyelid fissure seems much larger (Turner, 2008). After this transection, the remaining entropion has to be treated with a Hotz–Celsus resection. However, as a result of the lateral ligament resection, the tone of lateral canthus may decrease over time resulting in macropalpebral fissure syndrome. In this study, we adapted a resection of skin procedure by widening the incision. We estimated the tension of the lateral canthus after removing the lateral canthal skin in an arrowhead shape, and then created a wider incision to provide appropriate tension of lateral canthus medially (Fig. 1). With this procedure, we did not need to perform a lateral canthal ligament resection.

Conclusions: The slightly modified arrowhead procedure is an effective treatment option with good outcomes for lateral canthal entropion in Chow Chow dogs.

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Author's contributions: JYK designed and carried out the survey and drafted the manuscript. YSL helped with

patient management and drew the Fig. 1. SWJ participated in the design of the study and reviewed manuscript. All authors read and approved the final manuscript.

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