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Bilateral Upper Eyelid Entropion in a HanWoo (*Bos taurus coreanae*) Calf

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Abstract : An 18-day-old male HanWoo calf was presented to the Animal Medical Center of Jeonbuk National University with a history of bilateral blepharospasm and epiphora. The calf was infected with rotavirus and was severly dehydrated. On ophthalmic examination, enophthalmos was noticed and the calf was diagnosed with bilateral upper eyelid entropion and resultant trichiasis. As a treatment, skin staples were applied, and the entropion was successfully corrected. Further, entropion has not recurred through the follow-up period.

Key words **:** entropion, calf, upper eyelid, skin staple, rotavirus.

Introduction

Entropion is an inward rolling of the eyelid that causes the irritation of the globe of the eye via the periouclar hair and eyelashes (4,12). Entropion can be congenital in origin or acquired during a lifetime. In congential entropion, the lower eyelid is commonly affected, and this usually occurs in both eyes. The causes of acquired entropion include dehydration, emaciation, eyelid trauma, eyelid scarring (cicatricial entropion) and the contraction of the orbicularis oculi muscle (spastic entropion) (5,7,16). The prevalence of entropion is common in sheep and dogs; however, in cattle, it is hardly reported (1,6). The clinical signs of entropion include blepharospasm, epiphora, eye rubbing and keratoconjunctivitis (16). Entropion can be corrected by temporary procedures or permanent surgical methods. It is recommended to choose temporary corrective procedures as the first option, especially when the patient is at a young age, because the condition could improve over time, and permanent corrective surgery conducted at a young age can cause eyelid eversion after facial maturity is reached (1,4,6,16). The temporary corrective procedures include the administration of a subcutaneous liquid injection to the eyelid and tacking sutures or staples (1,7).

In this case, a calf with bilateral upper eyelid entropion and resultant trichiasis, assumed to be caused by rotavirus infection, is presented. The entropion was corrected with a temporary eyelid tacking procedure using skin staples.

Case Report

An 18-day-old male HanWoo (*Bos taurus coreanae*) calf was referred to the Animal Medical Center of the Jeonbuk National University with a history of bilateral blepharospasm and epiphora. According to the history, the calf had been diagnosed with rotavirus infection by a veterinarian and had suffered from diarrhea. The calf had received oral rehydration therapy, and two days before visiting the hospital, the diarrhea had stopped but the calf still presented with severe dehydration on the day of the visit. On ophthalmic examination, enophthalmos was noticed. The upper eyelids were slightly rolled in and the eyelashes were irritating the cornea in both eyes. Hyperemia of the conjunctiva was observed in both eyes and corneal ulcer, edema and vascularization were observed in the right eye. Partial hair loss was noted on the right eyelid and it was revealed that the owner had used an adhesive in an attempt to prevent the eyelashes from poking the calf's cornea (Fig 1).

The calf was diagnosed as bilateral upper eyelid entropion and resultant trichiaisis. Considering that the calf was still too young that it's face had not completely matured yet, and that the dehydration caused by rotavirus infection was assumed to be the primary cause of entropion, a temporary eyelid tacking procedure using skin staples was performed to treat both eyes.

The calf was restrained in lateral recumbency. The periocular hair including the eyelashes were shaved and the skin of each eyelid was disinfected using 10% povidone iodine solution. Following this, the ocular surface was disinfected using 0.5% povidone iodine solution. To resolve the spastic entropion, topical proparacaine hydrochloride (Alcaine® 0.5%; Alcon, Belgium) was applied. A skin staple (Acos™ 35W; Sunmedix Co., LTD, Korea) was first applied to the most severely rolled-in eyelid. One end of the staple was placed 2-3mm away from the eyelid margin and the skin of the eyelid was turned outward as far as required. Then, the opposite end of the staple was placed on the skin distal from the eyelid margin perpendicularly. Following this, the staple was fixed. Additional staples were placed until the entropion was sufficiently corrected. After the correction, palpebral reflex was checked on the medial and lateral sides to confirm that the staples were not irritating the corneas or conjunctiva and that

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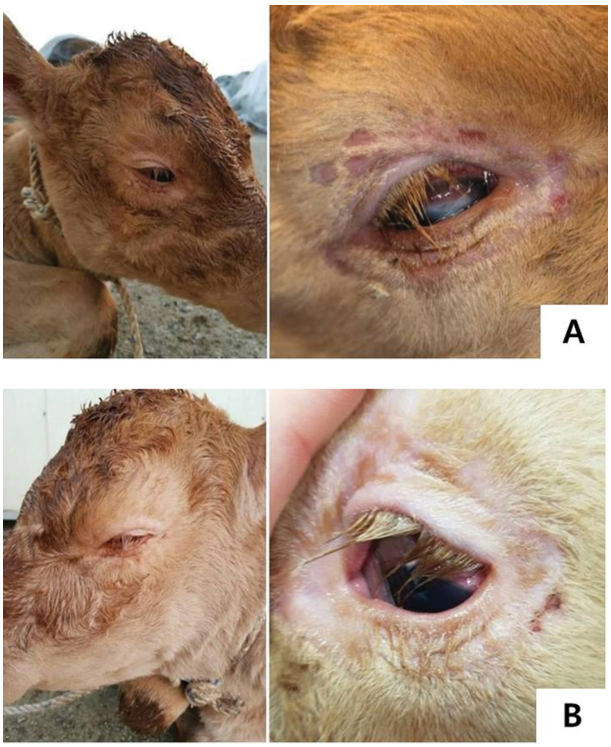

Fig 1. The initial ophthalmic examination. (A) The right eye. (B) The left eye. The upper eyelids were slightly rolled in and the eyelashes were irritating the cornea in both eyes. The conjunctival hyperemia was observed in both eyes and the corneal ulcer, edema and vascularization were observed in the right eye. Partial hair loss was also noted on the right eyelid.

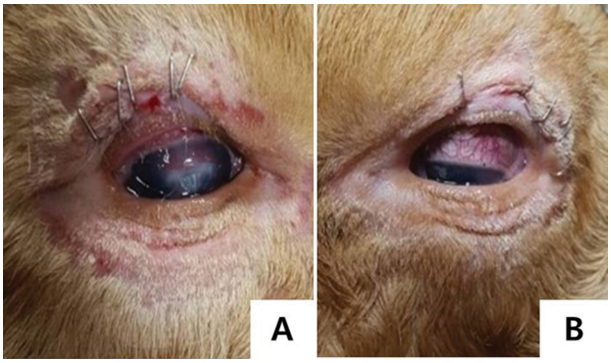

Fig 2. After a temporary eyelid tacking procedure using skin staples. (A) The right eye. (B) The left eye.

the eyelids were not rolled out. If the calf was not able to blink properly, the staple was removed and placed again in another site (Fig 2). After the procedure, ophthalmic ofloxacin ointment (Ocuflox®, q12h; Samil Co., LTD, Korea) was prescribed.

The post-procedure condition of the calf was monitored via pictures and phone contact with the owner. Seven days after the procedure, the calf was free from blepharospasm and epiphora. The corneal ulcer was evaluated and was found to be in a better condition. Additionally, it was noticed that none of the staples had fallen out (Fig 3). The calf no longer had diarrhea and dehydration was almost corrected. After 20 days, the cornea was clearer and no ophthalmic clinical signs

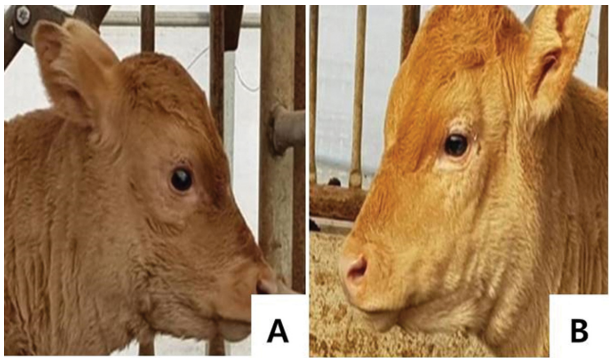

Fig 3. Seven days after the procedure. (A) The right eye. (B) The left eye. The calf was free from blepharospasm and epiphora. Additionally, it was noticed that none of the staples had fallen out.

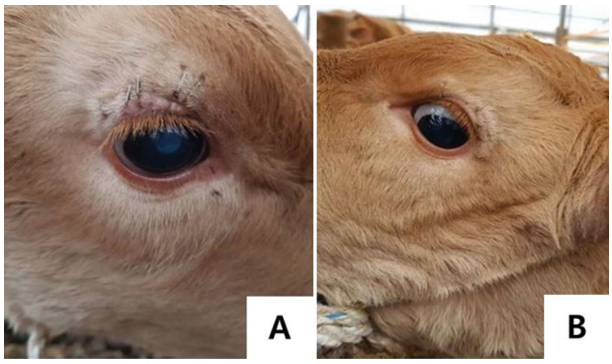

Fig 4. 20 days after the procedure. (A) The right eye. (B) The left eye. No ophthalmic clinical signs were noticed and the cornea restored it's transparency. However, as the facial maturity continued to progress, the staples were pulled up, thereby damaging the skin of the right eyelid.

were noticed. However, as the facial maturity continued to progress and when the dehydration was fully corrected, the staples were pulled up, thereby damaging the skin of the right eyelid (Fig 4). Following this, the staples were removed from the right eyelid and the calf was confirmed that the entropion and trichiasis had not relapsed.

Discussion

Although congenital entropion could affect both the upper and lower eyelids, the lower eyelid tends to be more commonly affected (1,12,17). The prevalence of entropion is common in dogs but the upper eyelid entropion usually occurs less than the lower eyelid entropion. The upper eyelid entropion occurs in dogs with excessive facial skin such as chow chows and shar-peis. In these cases, stellate rhytidectomy is indicated rather than conventional entropion treatment (15). The prevalence of entropion is rare in cattle and there are few reports on cases of entropion in cattle (2,9,10). To the author's knowledge, there is no report on the correction of entropion in cattle using skin staples. This case is worth reporting as it outlines an occurrence of upper eyelid entropion in cattle and it's successful correction with skin staples.

The etiology of entropion could be multifactorial. Dehydration, one of the causes of acquired entropion, could occur owing to infectious diarrhea (1,7). The most common infectious agents responsible for calf diarrhea are *Cryptosporidium parvum*, enterotoxic *Escherichia coli*, coronavirus and rotavirus (3). As a result of the dehydration that occurs secondary to diarrhea, enophthalmos and loss of eyelid elasticity could occur that in turn could lead to the onset of entropion (16). In this case, the calf was infected by rotivirus and it caused severe diarrhea and dehydration. The rotavirus infection was considered to be the contributing factor behind the onset of entropion; however, the hereditary nature of the origin of entropion should also be considered. The researches conducted on the genetic characteristics of entropion have been conducted on sheep and have revealed the relatively high level of heritability of this condition (11,13). Although the mode of inheritance has not been established yet, a study on the genetic feature of entropion in cattle has also been reported (9). It is recommended not to breed affected animals due to the hereditary aspect of entropion.

In many textbooks, it is strongly recommended to delay surgical correction of entropion until the facial maturity is reached (1,4-7,16). Entropion could improves as complete facial growth is achieved. If the onset of entropion is secondary to underlying factors (e.g., dehydration and emaciation), it could be resolved with the correction of the primary issues behind the condition (5,8). Permanent corrective surgery while the patient is at a young age could lead to eyelid eversion after facial maturity is reached. Even among mature animals, if there are underlying predisposing factors causing entropion, the primary causes should be managed first while the eyelid is corrected temporarily until the underlying problems are resolved. After the temporary corrective procedures have been tried and have failed, then a permanent sugical correction needs to be considered (1,8,16). In this case, as the facial maturity progressed and the dehydration was corrected, the temporary tacking staples were pulled up in the right eyelid. The staples were removed from the right eyelid and it was confirmed that the entropion and trichiasis had not recurred.

The temporary corrective procedures include subcutaneous liquid injection of the eyelid and temporary tacking sutures or staples (1,8). Compare to other methods, temporary tacking staples have some advantages. Usually it can be placed without sedation. It takes short time for applying and causes minimal trauma and irritation. It persist in the eyelid for long time and usually do not require disinfection after the procedure. Also, if entropion is improperly corrected, the staples can be easily removed and reapplied. (4,5,14).

In this case, it took about 10 minutes to correct the entropion in both eyes using skin staples. The procedure was performed without sedation and the calf did not struggle. Also, it was confirmed that the staples did not fall out until 20 days after the procedure. However, the patient needs to be frequently reexamined after the procdure and the staples should be removed if they cause irritation or eyelid eversion.

Conclusion

To the author's best knowledge, this is the first report of bilateral upper eyelid entropion in a calf that was treated with skin staples. A temporary tacking procedure using skin staples is a good treatment option for entropion that is caused by underlying problems especially when the patient is at a young age. Periodic follow-ups should be conducted to examine whether the staples are causing irritation to the eyes.

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