MANAGEMENT OF DACRYOCYSTITIS IN A RABBIT

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Abstract

The rabbit's anatomy of the nasolacrimal system is unique, with a single lacrimal punctum and a tortuous nasolacrimal duct. Inflammation of the nasolacrimal duct, dacryocystitis, can be caused by primary infection with bacteria from the respiratory tract, secondary to infectious conjunctivitis or nasolacrimal duct obstruction. The latter can occur due to the rabbit's anatomy features, the tears' high content of lipid, dental pathology, as a result of chronic inflammations, foreign bodies, neoplasms and hyperparathiroidism. Further investigations to reach a diagnosis and to treat the condition may require general anaesthesia.

A 5 year-old Angora rabbit was presented with dacryocystitis. The nasolacrimal duct could not be flushed. Conjunctival bacteriological samples isolated Coryneform bacteria, Staphylococcus and Pseudomonas that were sensitive to tobramycine and gentamycine. Local treatment with tobramycine was initiated with no improvement. Radiographic investigations in order to assess dental malocclusion were declined. Clinical improvement was achieved with acetylcysteine nebulization therapy and regular flushing of the nasolacrimal duct followed by topical instillation of aqueous antibiotic solution.

Key words: *acetylcysteine, dacryocystitis, nasolacrimal, nebulization, rabbit.*

INTRODUCTION

Ocular diseases of rabbits are important to diagnose and treat early as some of them are part of the clinical signs of systemic diseases with serious implications. Genetic defects, infections, congenital malformations, nutritional deficiencies, environmental and management factors are of importance in rabbit's eye disorders (Williams, 2007).

Dacryocystitis' ethiopathogenesis is correlated with the anatomical particularities of the nasolacrimal system (Marini, 1996). There is a single large nasolacrimal punctum located in the ventromedial fornix and a long and tortuous nasolacrimal duct that passes through the lacrimal and frontal bones, taking two flexures and emerging behind the dental roots to the nostril (Marini, 1996, Morera, 2005, Williams, 2007). The duct mucosa folds in some area and is lined up with columnar stratified or pseudostratified epithelium and the submucosa is formed by connective

tissue very rich in vessels which may contribute to progression of the inflammation at this site (Morera, 2005).
The nasolacrimal duct can be affected either by a primary infection either by a partial or complete obstruction caused by the underlying tooth roots elongation that leads to secondary infection and altered drainage (Morera, 2005, Williams, 2007). Tooth root elongation is the most common dental disease in pet rabbits that are fed mostly commercial food instead of fresh and dried grasses (Harcourt-Brown 2002, Williams, 2007). Elongated roots can penetrate the bone and emerge through the periosteum (Harcourt-Brown, 2002).
Clinical signs of dacryocystitis vary with the etiology and the degree of obstruction and include marked epiphora, serous then purulent white, creamy ocular discharge (Figure 1), conjunctivitis, nasal discharge, blepharitis, periocular dermatitis and alopecia, secondary keratitis and dental disease (Florin et al., 2009, Morera, 2005, Williams, 2007).

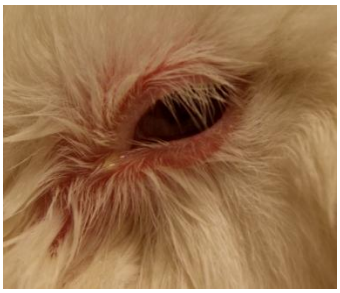

Figure 1.Epiphora with mucoid ocular discharge, blepharitis, periocular dermatitis (Enache original)

In a study of dacryocystitis in 28 rabbits the mean age was 4.4 years old, 89% was unilateral, 35% had an unknown cause, 50% had underlying dental diseases and 7% had nasal discharge (Florin et al., 2009).
Of 344 rabbits examined at the Veterinary Medical Hospital, Davis, California only 10% had ocular diseases, of which 73% had clinical signs of dacryocystitis (Burling, 1991).
Another research study performed on 586 New Zealand white rabbits showed an incidence rate of the ocular diseases of 9.6% and the most common condition was blepharitis and only 0.2% of the rabbits had dacryocystitis (Jeong et al, 2005).

MATERIALS AND METHODS

A 5 year-old Angora rabbit with a history of ocular discharge (Figure 2) presented at the Ophthalmology Department of the Faculty of Veterinary Medicine Bucharest for ophthalmic examination.

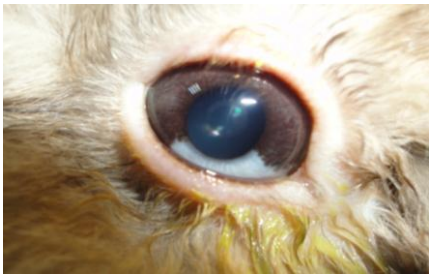

Figure 2.Ocular discharge (Ionascu original)

Focal illuminator, a direct and indirect ophthalmoscope were used for examination. Schirmer tear test strips and fluoresceine solution were part of the diagnostic procedures.
The oral cavity was also inspected for dental diseases but no macroscopic abnormality was detected. Further investigations by imaging the dental roots were declined. Bacteriological samples of the conjunctival discharge were collected and treatment was initiated based on the antibiogram.
Oxybuprocaine 0.4% was instilled into the inferior conjunctival sac as local anaesthesia to allow nasolacrimal duct irrigation. A syringe of two mL and a 21 G intravenous catheter with the stylet removed were used to approach the nasolacrimal punctum and to inject warm saline. A portable pediatric nebulizer device had ensured nebulization of the acetylcysteine solution mixed with saline prior to catheterization.

RESULTS AND DISCUSSIONS

The rabbit presented with intermittent periods of ocular discomfort as having epiphora, conjunctivitis with white, creamy ocular discharge and palpebral edema of both eyes. Clinical examination revealed nothing abnormal with no history of disease in the past.
Ophthalmic examination (Figure 3) showed good sight of vision, symmetric eyes, iridal heterochromia of both eyes and the presence of copious creamy

material at the medial canthus that could be expressed by digitally pressing the skin area of the nasolacrimal duct.

Figure 3.Rabbit ophthalmic examination (Enache original)

The Schirmer tear test values were over 20 mm, not due to excessive tearing, but the deficit in the tears' drainage (Figure 4). The fluoresceine test was negative for corneal erosions and the solution did not pass through nasolacrimal duct (Figure 5).

Figure 4.Schirmer tear test (Enache original)

Figure 5.Fluoresceine test (Ionascu original)

Conjunctival swab samples were obtained for bacteriologic culture at the Microbiology Department of the Faculty of Veterinary Medicine Bucharest and showed the presence of Coryneforms bacteria in the left eye and

Coryneforms, Staphylococcus and Pseudomonas in the right eye, sensitive to tobramycin, gentamicin and resistant to clindamycin.

Purulent ocular discharge with conjunctival hyperemia is a common sign of dacryocystitis but also to conjunctivitis. There have been several studies of the normal bacterial flora of the nasolacrimal system in rabbit (Cooper, 2011, Marini et al., 1996). The most common microorganisms isolated in the affected rabbit's conjunctiva were Moraxella sp., Oligella urethralis, Staphylococcus aureus, coagulase-negative Staphylococcus sp., and Streptococcus viridans and those isolated from the nasolacrimal duct flush fluid were Moraxella sp., S. viridans, and Neisseria sp (Marini et al., 1996). All microorganisms isolated were part of the normal conjunctival and nasolacrimal duct flora (Marini et al., 1996). An experimental chronic dacryocystitis was also obtained following inoculation of Staphyloccocus aureus in the lacrimal sac (Ishikawa et al., 2011, Snyder et al., 1976).

Treatment of dacryocystitis depends on the cause of the condition. Initially, daily periocular toilet and topical antibiotic instillation are performed for several weeks (Morera, 2005, Williams, 2007, Harcourt-Brown, 2002). If the ocular discharge is thick, acetylcysteine 1% can be used as a mucolytic along with repeated cannulation and flushing of the duct to remove the debris (Morera, 2005, Williams, 2007, Harcourt-Brown, 2002). The duct can be flushed with orofloxacin or gentamicin solutions or with an antibiotic based on the antibiogram but sometimes it requires repetition over several days to weeks (Williams, 2007). Severe cases require systemic antibiotics and pain relief and dental extractions if appropriate.

In this case, treatment was initiated with tobramycin instillations of one drop each eye twice daily. Tobramycin has been used for bacterial keratitis in a rabbit study (Bu et al, 2007).

The ocular signs persisted after four weeks of treatment, initial attempt of flushing the nasolacrimal duct was unsuccessful confirming the nasolacrimal duct obstruction. Revisit after one month of treatment had not shown significant improvement.

The second attempt of flushing the nasolacrimal duct was performed with acetylcysteine and saline solutions after inhalation of acetylcysteine by nebulization (Figure 6). This time the debris material could be flushed. Irrigation was performed under local anaesthesia with the conscious rabbit (Figure 7), with no undesirable reactions, although many authors recommend it under general anaesthesia (Morera, 2005, Williams, 2007). A 21G intravenous catheter was used, but 22 G or 24 G sizes can be used to minimize the risk of injuries (Morera, 2005, Harcourt-Brown, 2002).

Figure 6.Nebulization therapy (Enache original)

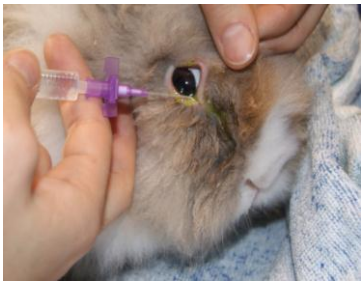

Figure 7.Nasolacrimal duct irrigation (Enache original)

Irrigation should always be performed slowly, without excessive pressure as there is a high risk of breaking the duct (Morera, 2005, Harcourt-Brown, 2002).
Acetylcysteine was proven to reduce the activity of the mucociliary system against tobramycin absorbtion and therefore to improve its action (Wang et al, 2000). Nebulization allows a higher bioavailability of the drug as the clearance of the small droplets is slower (Wang et al, 2000).
Treatment with local instillation twice daily of tobramycin and hyaluronic acid eye drops continued along with duct irrigations every 3 days, for two weeks. With irrigations and nebulization therapy the clinical signs improved, the palpebral edema and conjunctivitis disappeared (Figure 8).

Figure 8.Clinical aspect after treatment (Enache original)

Telephone updates were collected and there was no more eye discharge except occasional tearing when eating carrots.

CONCLUSIONS

Epiphora can be associated with early signs of dental disease, causing the blockage of the nasolacrimal duct.
Based on the ocular signs and the response to treatment, the nasolacrimal duct was either partially blocked with purulent material caused by a bacterial infection or partially obstructed by dental roots elongation.
Nasolacrimal duct is predisposed to obstruction due to infectious diseases, dental diseases or maxillary bone changes secondary to nutritional hyperparathyroidism.
As further investigations of dental roots were declined, a good management of this condition was achieved through repeated nebulization and flushing duct therapy along with local antibiotic treatment.

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