SURGICAL TREATMENT OF PROLAPSE OF THE DEEP LACRIMAL GLAND IN A PET RABBIT

Vittorio Capello, DVM, Dip. ECZM (Small Mammal), Dip. ABVP (Exotic Companion Mammal)

Abstract

A 5-year-old pet rabbit with a history of severe acquired dental disease and rhinitis was presented for unilateral prolapse of the deep lacrimal gland of the third eyelid. The prolapse was believed to be due to abnormalities of the alveolar bullae secondary to severe dental disease and rhinitis. The prolapse was successfully replaced using a combination of techniques used in canine ophthalmology: the creation of a pocket or envelope in adjacent mucosa to cover the gland, and anchoring the nictitans to the periosteum. Correction was successful and the gland remained in place without complications until the rabbit's death 4.5 years later. Copyright 2015 Elsevier Inc. All rights reserved.

Key words: rabbit; nictitating membrane; lacrimal glands; deep gland; prolapse

There are several lacrimal glands (lacrimal gland proper, accessory lacrimal gland, and the gland of the nictitating membrane) located within the rabbit orbit.[1-3] Most of the rabbit's lacrimal glands are divided into multiple lobes (Fig. 1A). The lacrimal gland proper is a curved aggregation of small glandular lobes, located in the caudodorsal area of the orbit. The accessory lacrimal gland is much larger and divided into 3 lobes: the orbital, the retro-orbital, and the infraorbital. The glands associated with the nictitating membrane (or nictitans) are commonly referred to as the Harderian gland and are divided into the superficial gland and the deep gland.[1,2] The superficial gland is small and lies over the anterior convex surface of the supporting cartilage of the nictitans. The deep gland is large, lies over the posterior convex surface of the cartilage, and is divided into 2 additional lobes: the dorsal white lobe and the ventral pink lobe.

The lacrimal glands and the nictitating membrane are closely associated with the globe, the orbit, and other anatomical structures within the orbital fossa (e.g., lacrimal bone and alveolar bulla).

In rabbits, the *alveolar bulla* is a unique bony structure that includes the reserve crowns and apices of the 4 caudal cheek teeth (3rd premolar and 3 molar teeth) (Fig. 1B and C).[3,4] In cases of acquired dental disease involving the maxillary cheek teeth, elongation of the reserve crowns may cause deformity and/or perforation of the alveolar bulla, creating secondary disease that subsequently includes the nictitans and its glands, or the more cranial infraorbital lobe of the accessory lacrimal gland.[2,4,5] Periapical infection of the cheek teeth associated with the alveolar bulla may also involve the glands of the nictitating membrane and lacrimal glands leading to retrobulbar or parabulbar abscesses.[5]

CASE REPORT

A 5-year-old, 1.3 kg neutered male pet domestic rabbit (*Oryctolagus cuniculus*) was presented for evaluation and treatment of chronic (2 years) advanced dental disease. The dental disease was characterized by multiple sites of periapical

From the Clinica Veterinaria S. Siro, Milano, Italy.
Address correspondence to: Vittorio Capello, DVM, Dip. ECZM (Small Mammal), Dip. ABVP (Exotic Companion Mammal), Clinica Veterinaria S. Siro, Via Lampugnano 99, 20151 Milano, Italy. E-mail: capellov@tin.it

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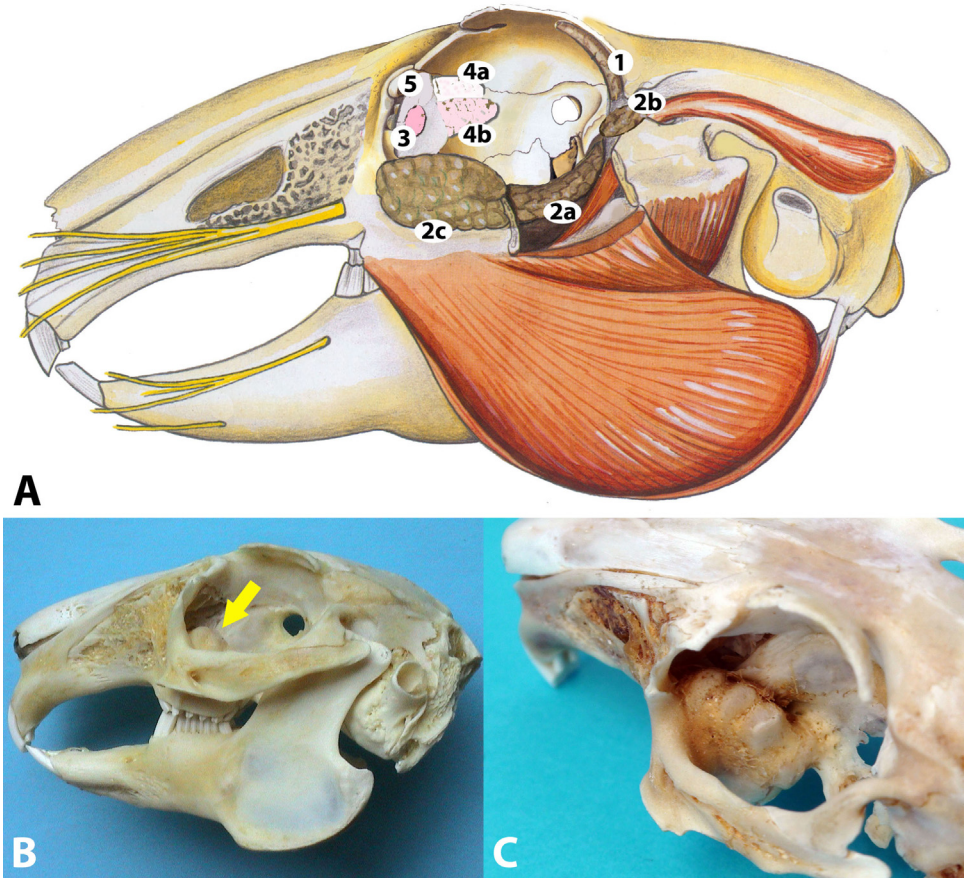

FIGURE 1. (A to C) Anatomy of the lacrimal glands and the orbit of the rabbit. (A) Lacrimal glands and glands of the nictitating membrane of the domestic rabbit, after removal of the globe. 1. Lacrimal gland proper; 2. Accessory lacrimal gland (2a orbital lobe; 2b retro-orbital lobe; and 2c infraorbital lobe); 3. Superficial gland of the nictitating membrane; 4. Deep gland of the nictitating membrane (4a, white dorsal lobe and 4b, pink ventral lobe); 5. Nictitating membrane. Adapted and modified from Popesko et al.[3] (B) Alveolar bulla (arrow). (C) Caudodorsal view of the orbit, showing the anatomic relationship with the alveolar bulla. (B and C, used with permission from Vittorio Capello, DVM.)

infection, osteomyelitis, and abscesses of the left maxilla and both mandibles, which resulted in fractures to the bodies of both mandibles. Chronic, end-stage dental disease was managed effectively with frequent dental re-evaluations and treatments (coronal reduction and extractions) supported by adequate supportive feeding (pelleted food and assisted feeding formula for herbivores [Critical Care for Herbivores; Oxbow Animal Health, Murdock, NE USA], ensuring a good quality of life. The rabbit developed clinical signs consistent with bilateral rhinitis including mucopurulent nasal discharge, sneezing, matted fur around the nose and the forelimbs, and labored breathing, 6 months before nictitans prolapse.

Medical treatment of rhinitis included injectable procaine penicillin (40,000 IU/kg, subcutaneously once a day for 3 weeks, Procacillina; Merial Italia, Milano, Italy) and acetylcysteine (nebulization once a day for 10 days, Fluimucil; Zambon Group, Milano, Italy). Labored breathing improved following decrease of the nasal discharge, but the clinical signs did not resolve.

The patient was re-examined 4 weeks following the initiation of therapy. Rhinitis was still present, and the rabbit was presented with protrusion of the nictitating membrane of the left eye, associated with prolapse of the deep gland (Fig. 2). The prolapse did not appear to elicit discomfort, and mild epiphora was present. Inspection of the posterior side of the nictitating membrane was performed after topical application of oxybuprocaine 0.4% ophtalmic solution (Novesina, Novartis, Italy). It was determined at that time the prolapse involved the dorsal white lobe of the deep gland, while the right eye was normal.

The rabbit was scheduled for computed tomography (CT) to further evaluate the nasal cavities. The patient was premedicated with