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CASE REPORT

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Dacryocystitis in dogs caused by foreign bodies—Diagnosis and therapy in 14 Cases

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Abstract

Objective: To describe foreign bodies (FBs) in the nasolacrimal sac of dogs, the history, and simple diagnostic and therapeutic approaches.

Animals studied

Fourteen dogs of different breeds, ages, and sexes were presented with unilateral dacryocystitis and had been treated without success for over 1–8 months.

Procedures: Patient history, including prior treatment, was obtained from medical records. Slit-lamp examination was performed in all cases (SL 17, Kowa Company Ltd.). Jones tests 1 and/or 2 were performed in 13/14 cases. Dacryocystotomy was initiated with an incision into one canaliculus until the lacrimal sac was exposed and could be explored. After extracting the FB from the nasolacrimal sac, the surgical wound and canaliculus were left open. Aftercare included the administration of antibiotic eye drops with or without dexamethasone and systemic analgesia.

Results: All 14 dogs were mesocephalic. Four of them were Dachshunds. Dacryocystotomy revealed plant-related FBs in all cases. The purulent discharge disappeared immediately after removal and did not recur during follow-up.

Conclusions: A simple dacryocystotomy is recommended for dogs with a strong suspicion of a foreign body in the lacrimal drainage system. Dacryocystorhinography appears to be an optional tool in these cases.

KEYWORDS

canaliculus, dacryocystitis, dacryocystotomy, dog, foreign bodies, nasolacrimal sac

1 | INTRODUCTION

Chronic dacryocystitis may cause unilateral conjunctivitis, often with excessive ocular discharge, but with no other apparent clinical signs.[1] The presence of mucoid to purulent discharge largely concentrated over the nasal aspects of the inferior cul-de-sac is typical.[2] The cause of dacryocystitis in companion animals has been described as a bacterial infection secondary to a congenital or acquired anomaly or a foreign body (FB) in the tear-evacuating pathways.[1,3–9]

As a general rule, the diagnosis of dacryocystitis is confirmed through the use of dacryocystorhinography and cytologic examination.[4] However, neither

dacryocystorhinography nor contrast computed tomography always leads to an etiological diagnosis.[10] The present case series is intended to report typical history, clinical data, and a simplified diagnostic and therapeutic procedure in dogs with dacryocystitis secondary to an FB lodging in the nasolacrimal sac.

This case report includes patients for whom the presented surgical technique was done as part of therapy. The owners of the patients consented to the publication of data and photographs, in accordance with the local ethical requirements.

2 | MATERIALS AND METHODS

All dogs presenting to our clinic (2015–2020) with marked recurrent or persistent purulent discharge from one eye and where the ophthalmic examination revealed the expression of purulent material from one or both lacrimal puncta (Figure 1) were included in this study.

The exclusion criteria were congenital discharge and discharge caused by obstruction of the nasolacrimal duct after head trauma.

Patient history, including that of prior treatment, was obtained from the patients' medical records.

Clinical data were obtained using slit-lamp biomicroscopy (SL 17, Kowa Company Ltd.).

Controls for nasolacrimal duct (NLD) patency were performed in 13/14 cases. Jones test 1 was performed by the authors of this case report for 8/14 cases. Referring veterinarians previously performed nasolacrimal flush (Jones test 2) in 10/14 cases and bacterial culture in 5/14 cases. Signalment, patient history, including that of prior treatment, and clinical data of the animals are summarized in Table 1. Dacryocystotomy using a microscope was planned due to strong suspicion of a FB in the lacrimal drainage system.

FIGURE 1 Marked purulent discharge from the left eye

After introduction of inhalation anesthesia, antegrade irrigation was attempted in three cases at the start of the procedure. The medial canthal region was exposed using an eyelid spreader and retention sutures (6/0 nylon, Ethilon®, Ethicon). One stay suture was placed in the caruncle and the other in the nasal skin adjacent to the medial canthus (Figure 2).

Following the purulent discharge tract, an incision was made into the upper or lower canaliculus with a vannas scissor until the lacrimal sac was exposed and could be explored. After extracting the FB and flushing the nasolacrimal sac, the surgical wound and canaliculus were left open. Aftercare included the administration of antibiotic eye drops with or without dexamethasone for approximately 1 week and 1 mg/kg Robenacoxib (Onsior®, Elanco) for 3 days. Jones test 1 was repeated during the follow-up period in 6/14 cases.

3 | RESULTS

Fourteen dogs of different breeds, ages, and both sexes were referred to our clinic with marked recurring purulent discharge from one eye due to dacryocystitis.

All dogs in this case series were mesocephalic. Four of the 14 dogs were Dachshunds, three were mixed breeds, and three were Retrievers. The breeds Weimaraner, German shepherd, Gordon Setter, and Jack Russel Terrier were each represented once.

Patients were between 1 and 12 years old (median: 5.5 years). Each sex accounted for 7 dogs.

In 9 and 5 cases, the left and the right eyes were affected, respectively.

The disease was sudden-onset and persistent since then. A history of recurrent unilateral purulent discharge persisting between 4 and 32 weeks was observed in 12/14 cases. In two cases, the exact duration was unknown. Thirteen of the 14 patients were pre-treated with antibiotic eye drops or ointments with or without corticosteroids with only temporary responses. Bacterial culture was negative in two of five cases (Table 1).

Ophthalmic examination revealed the expression of purulent material from one or both lacrimal puncta and mild-to-moderate conjunctivitis in all cases (Figure 1).

Jones test 1 was negative in 8/8 cases (Figure 3). Nasolacrimal flush (Jones test 2, previously performed by the referring vets) was not possible in 8/10 cases.

Other findings in the affected eyes were distichiasis in two cases, and dry eye syndrome, macroblepharon, iris

TABLE 1 Signalement, anamnesis, clinical data, therapies, and outcomes of 14 dogs

Case number	Breed	Age [years]	Sex	Eye	Pre-treatment	
					Eye-drugs	Bacterial culture
1	Dachshund (wirehaired)	4	F	Os	Dexamethason-Gentamicin, Ofloxacine	No
2	Dachshund (wirehaired)	12	M	Os	Cyclosporine 0.2%, Hylauronic acid, Fucidine acid, Bepanthen	Yes: negative
3	Mixed breed	7	F	Od	Dexamethason-Neomycine Chloramphenicol	*Staphyloccus aureus*: sensible to all
4	German shepherd	9	M	Os	Chlortetracycline, Ofloxacine, Dexamethason-Neomycin	No
5	Jack Russel Terrier	9	F	Od	Chloramphenicol-Dexamethason	No
6	Labrador Retriever	1	F	Os	Dexamethason-Gentamicine, Ofloxacine	no
7	Weimaraner	5	F	Os	Chlortetracycline, Ofloxacine,	No
8	Golden Retriever	8	F	Os	None	No
9	Dachshund (standard)	2	M	Od	Dexamethason- Gentamicin, Ofloxacine	No
10	Mixed breed	6	M	Os	Dexamethason-Neomycin	No
11	Mixed breed	2	M	Od	Cortison Prednisolon Hyaluronic acid (systemically: Enrofloxacin)	*Staphylococcus pseudointermedius*: sensible for Marbofloxacin, Gentamicin, Neomycin, Kanamycin, Chloramphenicol
12	Gordon Setter	1	M	Os	Moxifloxacin, Dexamethason-Neomycin	*Bacillus cereus*: sensible for Moxifloxacin, Ofloxacin, Chloramphenicol
13	Golden Retriever	3	F	Os	Dexamethason-Gentamicin, Chloramphenicol, Fucidine acid, Dexamethason-Neomycin, Chloramphenicol-Dexamethason, Cyclosporine 0.2%	No
14	Dachshund (standard)	10	M	Od	Ofloxacin u.a.	Yes: negative

Abbreviations: F, female; KCS, Keratoconjunctivitis sicca; M, male; N.e., not examined; NLD, nasolacrimal duct; Od, oculus dexter; Os, oculus sinister.

atrophy, and persistent pupillary membrane in one case each.

Antegrade irrigation was unsuccessful for removing the FB in three cases.

Dacryocystotomy revealed one or two plant-related FB(s) in all cases (Figure 4).

The patients were followed up between 1 and 180 days (median: 45.5 days). Six patients were followed during clinical visits and eight through phone interviews of the owners. The purulent discharge disappeared postoperatively in all cases. There was no to mild ocular discharge in 13/14 cases. The discharge remained mucoid after removal of the lacrimal sac FB in the patient with dry eye syndrome. At follow-up, the Jones 2 test was positive in 3/6 cases (Table 1).

4 | DISCUSSION

Dacryocystitis in dogs is described in the literature as secondary to FBs that lodge in the nasolacrimal sac or duct,[2,3,6] inflammation or infection of the accessory nasolacrimal duct,[11] granuloma,[12] cystic dilatation of the duct,[5] obstruction of the duct,[13] and ectopic intranasal tooth.[9] In all patients of this report, symptoms started later in life, which is why congenital anomalies seemed to be unlikely.

	Patency of the NLD		Additional findings	Aftercare		Follow-up		
Days	Jones 1	Jones 2		Eye-drugs	Days	Days	Jones 1	Discharge
56	n.e.	Negative	-	Dexamethason	28	28	n.e.	None
Unknown	n.e.	Negative	KCS End-stage	Chloramphenicol Tacrolimus Hyaluronic acids	7 Long-term	56	n.e.	Mucoid because of end-stage-KCS
49	n.e.	Negative	-	Chloramphenicol	4	180	Positive	Rare serous
35	n.e.	Negative	-	Dexamethason-Neomycine Chloramphenicol	7	180	n.e.	Rare serous
28	Negative	Positive	-	Chloramphenicol-Dexamethason	7	120	n.e.	Rare serous
42	n.e.	n.e.	-	Dexamethason-Neomycine	7	150	n.e.	Rare serous
Unknown	Negative	n.e.	Irisatrophy	Dexamethason-Gentamicine	7	90	n.e.	None
63	Negative	Negative	-	Dexamethason-Gentamicine	7	120	Positive	None
28	Negative	Negative	PPM corneae et lentis	Dexamethason-Gentamicine	7	21	Negative	Very little seromucoid
84	Negative	n.e.	-	Chloramphenicol-Dexamethason	10	30	Negative	Rare serous
28	Negative	Positive	-	Bibrocathol	7	21	Negative	Very little mucoid
148	n.e.	Negative	Makroblepharon	Cloxacillin	4	1	n.e.	None
84	Negative	n.e.	Distichiasis	Dexamethason, Neomycin, Polymyxin	5	5	Positive	None
240	Negative	Negative	Distichiasis	Dexamethason, Gentamicine	5	35	n.e.	None

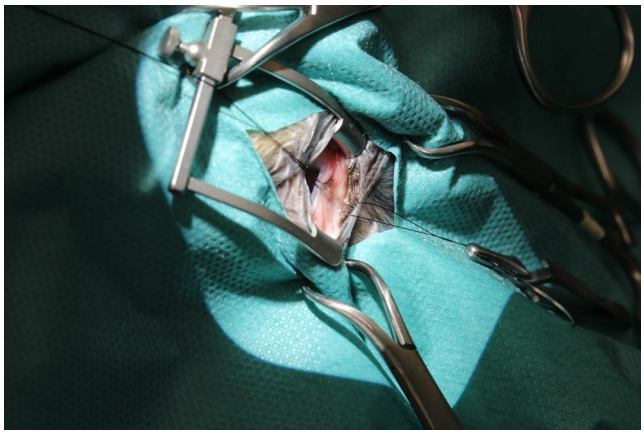

FIGURE 2 Exposition of the medial canthal region of a right eye

FIGURE 3 Positive Jones test 1 on the right side, negative test on the left

In all cases of the present case series, one or two plant-based FB(s) were identified in the nasolacrimal sac, similar to the findings of Barsotti et al.[3]

Mesocephalic dogs were affected exclusively in this case series, similar to a study on 22 dogs with dacryocystitis.[9] Possible FBs could enter the lower canaliculus, especially because the punctum is more open than the inverted opening of the tubule in brachycephalic dogs. Dachshunds were overrepresented in the patient cohort in the present report. It is possible that this breed is more predisposed than other breeds to lacrimal drainage system FBs because of the proximity of their head to the ground when exhibiting burrow-hunting behavior.

Jones test 1 was negative in all the eight tested eyes in this study and was evident for an obstruction. Jones test 2 was not repeated by the authors because the orthograde irrigation could push the suspected FB out of the lacrimal sac in the bony part of the nasolacrimal duct. The latter situation must be avoided because invasive surgical exploration would then be needed.[6]

In veterinary medicine, dacryocystorhinography and contrast computed tomography (CT) have been used for further evaluation of the nasolacrimal apparatus.[7,10,14–16] CT appears more advantageous than magnetic resonance imaging because of the relatively long, small diameter, and bony nasolacrimal canal in most domestic pet species.[10] Nevertheless, diagnosis of the etiological agent remains difficult in cases of partial or complete obstruction. Furthermore, the contrast medium frequently spills into the nasal cavity, resulting in a positive contrast rhinogram.[10]

Dacryocystorhinography or contrast CT were not performed because dacryocystitis secondary to an FB in the nasolacrimal sac was suspected in all cases in this report because of recurrence despite antibiotic therapy (sometimes with antibiogram) and/or the impossibility of nasolacrimal flush in 8/10 cases.

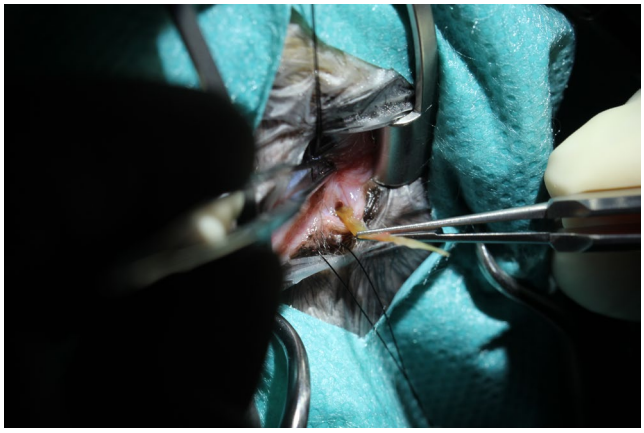

FIGURE 4 Removing of a grass awn out of the lacrimal sac

Treatment for dacryocystitis in companion animals includes repeated irrigation,[2] nasolacrimal catheterization,[2,17] dacryocystotomy,[4] dacryoendoscopy,[11] dacryocystomaxillorhinostomy,[12] rhinotomy,[8] surgical exploration of the maxillary sinus,[5] intraosseous approach,[6,7] lacrimoscopy with stenting,[13] and ultrasonography-guided removal of FB.[3]

Ortho- and antegrade irrigations were not successful in the cases of this report. The presence of an accessory opening of the middle part of the nasolacrimal duct has been reported.[18] It is possible that fluid loss occurred through this accessory opening, preventing sufficient pressure from building up and dislodging the FB from the lacrimal drainage system.

Previously ultrasonography-guided removal of foreign bodies has been reported.[3] However, in the author's experience, this carries the risk of perforating the thin membranous wall of the lacrimal sac due to tissue vulnerability caused by chronic inflammation.

The authors decided to perform dacryocystotomy in all cases in this report. Access was created by an incision in one canaliculus until the lacrimal sac could be explored, unlike dacryocystotomy via skin incision ventral to the medial canthus with blunt-sharp dissection of the periorbital tissues.[19] In one case report, an air drill was used to drill through the lacrimal bone into the lacrimal sac.[20] In contrast, the method that was used in the present study was arguably less involved and took a relatively short time, provided a good visualization of the canaliculus and the sac and caused no further damage to the surrounding tissue. After removing the FB, the nasolacrimal sac and tubule were left open. This resulted in easier access for cleansing and wound healing.

Postsurgical nasolacrimal catheterization for the prevention of obstruction may need to remain in place for several months.[1,13,17] Also, in the authors' experience, the procedure might be stressful for the patient and might not provide long-term success, all of which might cause owners to reject it. In the current study, half of the cases tested with the Jones test 1 had a positive result, and the majority of the owners reported being pleased with the outcome.

The limitations of this report are the small sample and the retrospective nature of the report. Consequently, pre-treatments and diagnostic approaches were inconsistent. Another cause of dacryocystitis compared to FB could not be definitively excluded before the surgical approach. If the therapy failed, further diagnostics should have been performed. In some cases, the follow-up period was very short. Consequent control of Jones test 1 in all cases at the same time postsurgically was very desirable.

Nevertheless, the results justify, in the authors' opinion, a simplified diagnostic and therapeutic approach in cases with a strong suspicion of FB-induced dacryocystitis in dogs. Dacryocystorhinography appears to be an optional tool in these cases.

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CONFLICT OF INTERESTS

There is no conflict of interest.

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