CASE REPORT

Keratoconjunctivitis associated with *Toxoplasma gondii* in a dog

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Abstract

A 12-year-old Pug presented with a 3-mm corneal mass OD. The dog was currently being treated for keratoconjunctivitis sicca (KCS) and pigmentary keratitis OU. A superficial keratectomy followed by cryotherapy was performed OD. A histopathologic diagnosis of epithelial dysplasia and suppurative keratitis was made and the lesion resolved. Two months later, a yellow/tan conjunctival mass, diffuse chemosis and conjunctival thickening was discovered OD. Necrotizing conjunctivitis with protozoal parasites was diagnosed with histopathology. Complete blood count and a serum biochemistry panel were normal. *Neospora caninum* and *Toxoplasma gondii* titers were negative. The conjunctivitis resolved after a 6-week course of oral clindamycin. Two months later, the patient presented with a similar conjunctival mass OS. *Toxoplasma gondii* was confirmed as the etiologic agent with immunohistochemical staining. Repeat *T. gondii* titers were negative. Oral clindamycin was re-instituted. The corneal biopsy was re-reviewed and protozoal organisms were discovered. Three months later, a recurrence was suspected and oral ponazuril was initiated for 28 days. There has been no evidence of recurrence since this treatment. Ocular toxoplasmosis is rare in the dog but reports have included episcleritis, scleritis, retinitis, anterior uveitis, ciliary epithelium hyperplasia, optic neuritis and polymyositis. To our knowledge, this is the first confirmed report of toxoplasmosis causing only corneal and conjunctival disease in the dog. We hypothesize that these localized lesions may be associated with topical immunomodulating therapy for KCS. Toxoplasmosis should be considered as a differential for canine conjunctivitis and corneal disease and has the potential to manifest in one or both eyes.

Key Words: conjunctivitis, dog, keratoconjunctivitis, keratitis, ponazuril, *Toxoplasma gondii*

HISTORY

A 12-year old, female-spayed Chinese Pug presented with a corneal mass OD that developed over the prior week. For the past 6 years the dog had been treated for keratoconjunctivitis sicca (KCS) and severe pigmentary keratitis with cyclosporinee (Optimmune® 0.2% ophthalmic ointment, Schering-Plough Animal Health Corporation, Summit, NJ) or tacrolimus 0.03% (Skip’s Pharmacy, Boca Raton, FL) and neomycin/polymycin/dexamethasone (neopolydex) (Fougera & Company, Melville, New York, NY) topical ophthalmic ointments. The current medical protocol consisted of tacrolimus 0.03% and neopolydex ointments in both eyes (OU) q8h. The dog was routinely examined every 3–4 months. There were no other known medical conditions. There was one other geriatric Pug in the household being treated for KCS. Both dogs were housedogs that were exercised on a lead several times a day. The owner traveled with both dogs throughout Florida.

INITIAL CLINICAL FINDINGS

Excluding ocular disease, vital parameters and physical examination were unremarkable. Menace responses and dazzle reflexes were present OU. Direct and consensual pupillary light reflexes were present OU. Schirmer tear test (Schering Plough Animal Health, Union, NJ) were normal OU (18 mm/min OD, 25 mm/min OS). Intraocular pressures (IOP) were normal OU (17 mmHg OD, 16 mmHg OS) with applanation tonometry (Tonopen-XL, Mentor O & O,
A 10-mm yellow/tan movable periligamental conjunctival mass was present from the 2–5 o’clock position (Fig. 1). The mass was excised by sharp excision following topical anesthesia and submitted for histopathology. Topical therapy included neomycin/polyoxymyloc B sulfates/gramicidin ophthalmic solution (Neocin, Bausch & Lomb, Inc.) OD q8h, neopolydex ointment OS q8h, and tacrolimus 0.3% ointment OU q8h.

On histopathology the conjunctival mass was partially epithelialized and subtended by loose connective tissue with extensive tissue necrosis, lymphoplasmacytic and supportive inflammatory infiltrate, and dilated blood vessels. In several areas, seemingly within endothelial cells, there were aggregated clusters of protozoal parasites, leading to the diagnosis of necrotizing conjunctivitis with protozoal parasites. Either Toxoplasma gondii or Neospora caninum were probable but could not be confirmed by histopathologic evaluation without immunohistochemical staining (Fig. 2). At this time, clindamycin (Ohm Laboratories, Inc., North Brunswick, NJ) 10 mg/kg PO q12h was initiated in addition to topical medications. Complete blood count (CBC) and serum biochemistry profile were normal and titers (IgG and IgM) for N. caninum and T. gondii were negative (Antech Diagnostics, Lake Success, NY).

After 6 weeks of clindamycin treatment, STT had decreased (15 mm/min OD, 25 mm/min OS) and moderate conjunctival hyperemia with no evidence of a conjunctival mass was present OD. Repeat CBC and titers for N. caninum and T. gondii were unchanged. The neopolygram ophthalmic solution and clindamycin were discontinued and flurbiprofen 0.03% ophthalmic solution (Pacific Pharma) OD q8h was initiated as a topical anti-inflammatory agent. The conjunctival hyperemia OD resolved after 6 weeks and the original medication protocol for KCS was re-instituted.

Twenty weeks following initial presentation, the dog returned with a 5-mm yellow/tan conjunctival mass and associated moderate conjunctival hyperemia OS. STT were normal OU (19 mm/min OD, 21 mm/min OS). Following topical anesthesia, the mass was excised by sharp excision and submitted for histopathology. Toxoplasma gondii titers (IgG and IgM) were negative. Clindamycin was re-instituted and continued for 10 weeks. The neopolydex ointment was replaced with neopolygram and flurbiprofen 0.03% solutions OS q8h.

Histopathology of the conjunctival mass OS was very similar to the conjunctival mass OD (Fig. 3). Immunohistochemical staining was positive for T. gondii antigens (Fig. 4). At this time, the initial corneal biopsy OD was re-reviewed and protozoal organisms were discovered.

Forty weeks following initial presentation, the dog had moderate conjunctival hyperemia and thickening with a developing conjunctival nodule OS. The current treatment protocol was neopolydex and tacrolimus 0.03% ointments OU q8h. Ponazuril (Marquis®, Bayer HealthCare LLC, Shawnee Mission, KS) 20 mg/kg PO q24h was initiated and continued for 28 days in addition to topical therapy.
At the last examination (6 months after completing pona-
zuril treatment), there was no evidence of toxoplasmosis OU
and both pigmentary keratitis and KCS OU were stable.

DISCUSSION

Toxoplasmosis is considered one of the most common
parasitic infections worldwide.\textsuperscript{4–6} This disease is caused by the
obligate intracellular protozoal organism, \textit{Toxoplasma gondii},
and the sexual form is found in the definitive feline host.\textsuperscript{4–6}
The parasite undergoes normal coccidian development in
the cat’s intestine leading to the shedding of oocysts, which
are extremely resistant to environmental influences.\textsuperscript{7} The
ingested sporozoites (found in oocysts) and/or bradyzoites
(found in tissue cysts) develop into tachyzoites, which are
disseminated throughout the vascular system to various
target organs, including the central nervous system, skeletal
muscles, visceral organs, and eye.\textsuperscript{6} These tachyzoites multiply
intracellularly and form cysts of bradyzoites in soft tissue.
Generally, the cysts remain dormant, the disease remains
non-clinical and the animal becomes a chronic carrier of
disease.\textsuperscript{8–10} Young dogs and cats, including those that contract
the organism \textit{in utero}, often develop severe and/or fatal
systemic disease.\textsuperscript{8} Adult animals may show a variety of clinical
Multiple serum samples were submitted in this case and all were negative. We believe that this local disease was not significant enough to generate a substantial humoral immune response.

To our knowledge, this is the first confirmed report of toxoplasmosis causing only corneal and conjunctival disease in the dog. We hypothesize that these localized lesions may be associated with topical immunomodulating therapy for KCS. Toxoplasmosis should be considered a differential for masses occurring in the conjunctiva and cornea and has the potential to manifest in one or OU. Ponazuril may be an effective treatment for toxoplasmosis in the dog.

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REFERENCES