



INVITED LECTURES - FULL PAPERS

Op – Ophthalmology

CLINICAL APPROACH TO THE DOG WITH RED EYE(S)

Ron Ofri, DVM, PhD, DECVO



Koret School of Veterinary
Medicine
Hebrew University of Jerusalem
PO Box 12
Rehovot 76100
ISRAEL
ofri@agri.huji.ac.il

A “red eye” is a common presenting complaint in veterinary medicine. It is caused by injection of the conjunctival, episcleral or ciliary blood vessels. When presented with a red eye, the clinician should consider three main differential diagnoses: conjunctivitis, anterior uveitis and glaucoma. Additional diseases, such as episcleritis and panophthalmitis, may also cause a red eye, but are far less frequent.

Several clinical signs should be evaluated (collectively) to diagnose the cause of the red eye:

- Vision: Vision is not affected in conjunctivitis. Glaucoma patients, however, frequently present with severe visual deficits or blindness. Anterior uveitis does not cause blindness per se, but corneal edema or opacities of the aqueous humor (e.g., aqueous flare, hyphema or hypopyon) may affect vision.
- Globe: The globe may be enlarged in glaucoma (buphthalmous). It may be enophthalmic (sunken), causing protrusion of the third eyelid. The globe is unchanged in conjunctivitis and anterior uveitis, but severe conjunctivitis of the third eyelid may cause elevation of the nictitating membrane.

-The “end stage” of glaucoma and severe uveitis may be atrophy of the globe (*phthisis bulbi*)

- Pain: Acute episodes of glaucoma are very painful, and may cause blepharospasm and general depression. Chronic stages of the disease are also painful, but the behavioral changes are usually more subtle, and may not be noticed by the owners. Similarly, acute anterior uveitis may be moderately painful, but chronic uveitis is not associated with overt pain signs. Conjunctivitis may present no pain, or with moderate irritation.
- Secretions: Anterior uveitis and glaucoma may present with increased lacrimation. Conjunctivitis may cause serous, mucoid or purulent discharge.
- Conjunctiva: The conjunctiva is thickened,

diffusely hyperemic, and possibly edematous (chemotic) in conjunctivitis. It is of normal consistency in glaucoma and anterior uveitis.

- Blood vessels: It is important to determine if the redness is caused by congestion of the conjunctival, episcleral or ciliary vessels.

-Mobilizing the conjunctiva with a swab will cause the conjunctival vessels to move, but will not affect the deeper vessels. Similarly, topical phenylephrine will cause immediate blanching of the conjunctival vessels, but will have a lesser effect on episcleral and ciliary vessels

-Redness associated with conjunctivitis is most visible on the palpebral surface and the fornix. The vessels are typically narrow, and diffuse congestion is seen.

-Episcleral vessels, which are congested in glaucoma, are much wider, and are seen on the bulbar surface, running towards the limbus.

-Ciliary vessels, which are congested in uveitis, can not be visualized as they are deep. They impart a red ciliary flush appearance to the eye.

-Note that both glaucoma and anterior uveitis may also cause conjunctival congestion, along with the respective episcleral and ciliary congestion.

- Cornea: It is unaffected in conjunctivitis (though it is involved in cases of kerato-conjunctivitis). It is edematous in both glaucoma and anterior uveitis. Deep corneal vascularization may be seen in both conditions.
- Pupil: The pupil is rarely affected by conjunctivitis. In glaucoma it is slightly to fully dilated. Reaction to light may be sluggish or absent, due to the effects of pressure on the iridal sphincter. The pupil is miotic in anterior uveitis, and therefore may show minimal constriction in response to light. The inflammation is often

accompanied by adhesions of the iris to the lens (posterior synechia), causing the pupil to be irregular in shape. A complete (annular) synechia will cause the pupil to be fixed.

- The iris surface is dark, congested and possibly neovascularized in anterior uveitis. Surface detail is lost. The iris becomes atrophic and thinner in chronic glaucoma. The iris is unaffected by conjunctivitis.
- Lens: It is unaffected in conjunctivitis. Both glaucoma and anterior uveitis may cause secondary lens luxation and/or cataracts. It is noteworthy that the reverse may also be true, as cataracts may induce anterior uveitis, and lens luxation may cause secondary glaucoma.
- Intraocular pressure: it is unaffected in conjunctivitis, elevated in glaucoma, and decreased in uncomplicated cases of anterior uveitis.
- Unique signs:
 - Lymphatic follicles hypertrophy in conjunctivitis
 - Glaucoma may cause striate keratopathy ("breaks" in Descemet's membrane), stretching and thinning of the sclera (equatorial staphyloma) and atrophy of the retina and optic nerve head. Cupping of the optic disc is pathognomonic for glaucoma.
 - Anterior uveitis will be accompanied by loss of transparency of the aqueous humor. This may present as aqueous flare, hyphema, hypopyon or cellular "debris" on the anterior lens capsule and posterior corneal surface. As a result, anterior and/or posterior synechia may form.
 - Anterior uveitis may also spread to the more posterior parts of the eye, causing posterior uveitis and vitreal inflammation. Severe cases may cause optic neuritis/atrophy and endophthalmitis.

Clinicians should remember that while glaucoma does not cause uveitis, the reverse is certainly true, and uveitis frequently causes secondary glaucoma. The glaucoma may be due to obstruction of the draining irido-corneal angle by inflammatory cells and debris that are present in the anterior chamber as part of the inflammatory response. Formation of adhesions between the iris and the cornea (anterior synechia) or the lens capsule (posterior synechia) will likewise impede the flow of aqueous humor in the eye. The latter is characterized by elevation of pressure in the posterior part of the eye, iris bombe.

As glaucoma is discussed elsewhere in these Proceedings, the following sections will be devoted to a brief discussion of conjunctivitis and anterior uveitis. Signs of the two diseases have already been described.

CONJUNCTIVITIS

There is a significant difference in the clinical approach to canine and feline conjunctivitis. In the dog, primary pathogens of the conjunctiva are rare, with the notable exception of the distemper virus. In most cases the infection is secondary, and the clinician should direct the efforts to identifying and treating the primary problem. In the cat, on the other hand, most cases are caused by primary pathogens of the conjunctiva, and treatment should be aimed at these infectious agents.

Canine conjunctivitis

As noted, infection of the conjunctiva is usually secondary to an underlying cause. The primary problem will cause the immune system of the conjunctiva to be compromised, allowing overgrowth by the natural flora of the conjunctiva or by opportunistic agents.

A common primary cause of canine conjunctivitis is chronic irritation and/or exposure resulting from anatomical problems of the lids (entropion, ectropion) or eyelashes (e.g., distichia, trichiasis). Irritation may also result from nasal folds and exposure in brachycephalic breeds, as well as exposure to chemicals, wind and dust. "Dry eye" (keratoconjunctivitis sicca), allergy, blepharitis and systemic dermatological diseases are also common causes of conjunctivitis.

Most of the diagnostic effort should be directed at identifying the primary cause. Careful inspection of the eyelid and eyelash conformation, a dermatological examination and Schirmer Tear Test may frequently reveal the cause of the inflammation. As the infection is usually secondary in nature, bacterial culture is usually not indicated. A more rewarding diagnostic approach may be cytology, to determine if the infection is allergic, bacterial or viral in nature. After the primary cause has been diagnosed and treated, most conjunctivitis cases will respond to a wide-spectrum antibiotic preparation; if needed, this may be combined with topical steroids.

Feline conjunctivitis

The common primary pathogens of the feline conjunctiva are Feline Herpes Virus 1, *Chlamydia felis* (*Chlamydia psittaci*) and *Mycoplasma felis*. Corneal involvement is common with the former, and respiratory disease may also be present. Diagnosis of the specific agent may be difficult, as cytology samples can be unrewarding, and a definitive diagnosis may require advanced techniques such as PCR or fluorescence. Furthermore, co-infections are common. *Mycoplasma* and *Chlamydia* are responsive to tetracyclines. The commercially

available anti-viral drugs are frequently ineffective against feline herpes, and effective drugs such as idoxuridine may be available only in compounding pharmacies. Recent studies suggest that interferon and lysine may be effective. Because of the possibility of latent herpes infection, stress, topical steroids and other cats should be avoided.

UVEITIS

Anterior uveitis is most commonly caused by an underlying primary problem, which triggers a secondary inflammatory response of the iris and ciliary body. It may be caused by virtually any systemic infectious disease, including viral, bacterial, fungal, protozoal and rickettsial; however, it is important to note that in many of these cases the primary infectious agent does not reach the eye, which is inflamed, rather

than infected. Non-infectious diseases causing vasculitis (e.g., toxemia, diabetes, etc.) may also cause uveitis. Ocular causes of uveitis include lens induced (an immune response to lenticular proteins leaking from cataracts), reflex uveitis triggered by keratitis, and ocular parasites (e.g., ophthalmomyiasis). Neoplasia should be considered in any unilateral uveitis in elderly patients. As in the case of canine conjunctivitis, the clinician should concentrate on diagnosing and treating the primary cause. The eye may be treated symptomatically with topical anti-inflammatories and with atropine (for cycloplegia and to reduce the risk of posterior synechia). Sub-conjunctival and systemic steroids may be added, depending on the severity of the uveitis and the patient's condition. Tissue plasminogen activator may be injected intraocularly to break fibrin bands and adhesions.