CONJUNCTIVITIS IN SMALL ANIMALS: DIAGNOSING AND TREATING CASES

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James Oliver discusses approaches to this condition, and explains the various methods of dealing with it, from using antibiotics to corticosteroids

THE conjunctiva is the mucous membrane that lines the inside of the eyelids, envelops the third eyelid and extends over the globe as far as the corneoscleral limbus.

The conjunctiva has several functions. It contributes to the formation of the tear film via goblet cells, which produce mucus.

The tear film acts to protect and nourish the conjunctiva and cornea. The conjunctiva also functions in immunologic protection of the eye, and contains numerous lymphocytes, which may undergo antigenic stimulation to form active lymphoid follicles.

Finally, the conjunctiva also has an important role in corneal healing, and is responsible for the formation of superficial neovascularisation of the cornea, which occurs in response to superficial corneal disease.

Causes of conjunctivitis

Diagnosing conjunctivitis itself is straightforward, although determining a specific aetiology can be more troublesome.

Awareness of the main causes of conjunctivitis, however, will maximise the outcome of the clinical examination, aid in the selection of any relevant ancillary diagnostic tests and, most importantly, enable the choice of the most appropriate treatment. The main causes of conjunctivitis in small animals are illustrated in Table 1.

History

Before examining the patient, it is paramount to gain a complete and accurate history from the owner. The history should establish:

• vaccination status and travel history;

• contact with affected animals or contaminated water;

• onset and duration of the problem;

• response to previous therapy; and

• general health of the animal.

Examination

A light source with magnification will elucidate the main signs of conjunctivitis. These are conjunctival hyperaemia, chemosis, discharge and follicle formation.

Conjunctival hyperaemia (Figure 1) needs to be distinguished from engorgement of deeper episcleral blood vessels, because episcleral involvement is suggestive of intraocular disease (such as uveitis and glaucoma), which may be sight-threatening.

Conjunctival blood vessels are fine, superficial, branch frequently and can be manipulated to move readily on the eyelids. Episcleral vessels are broader, deeper, branch less frequently and are relatively fixed in location.

Conjunctival and episcleral vessels can be distinguished by application of dilute adrenaline or phenylephrine. The superficial conjunctival vessels blanch more rapidly than their deeper episcleral counterparts. This method of distinction is rarely used, however, as the different vessels can readily be distinguished by direct examination.

The extent of chemosis (conjunctival oedema, Figure 2) varies in cases of conjunctivitis, and largely depends on the cause. Chemosis is most common in acute forms of conjunctivitis, such as in acute infections (for example, feline chlamydiosis and FHV-1) and toxic reactions.

Chemosis can also be seen in association with orbital disease, owing to reduced venous drainage.

The presence of an ocular discharge is usually what prompts most owners to seek veterinary advice in conjunctivitis cases.

Ocular discharge varies in type and severity from case to case, and may provide a clue as to the cause of conjunctivitis. Serous discharge results from hypersecretion from the aqueous-producing lacrimal glands, resulting from local irritation. Serous discharge may be seen in atopic or uncomplicated viral conjunctivitis.

More severe inflammation results in excessive mucus production from the conjunctival goblet cells. A tenacious mucoid discharge is common in keratoconjunctivitis sicca (Figures 3 and 4). The presence of a purulent exudate reflects the accumulation of neutrophils, and is suggestive of bacterial infection (Figures 5 and 6).

Lymphoid follicles are widespread in the conjunctiva and are particularly numerous on the inner aspect of the third eyelid. Follicular hyperplasia is not pathognomonic for any specific aetiology, but represents a non-specific reaction to chronic conjunctival irritation.

Close examination of the eye may reveal the cause of conjunctivitis. The conformation of the eyelids should be assessed to rule out entropion/ ectropion, and the presence of any irritating hairs investigated (distichia, ectopic cilia and trichiasis). Eversion of the eyelids and examination behind the third eyelid (following application of topical anaesthetic) allows examination of the entire conjunctiva and may reveal the presence of foreign bodies. The nasolacrimal puncta should also be evaluated.

Tear overflow (epiphora) can occur as a result of imperforate puncta and obstruction of the nasolacrimal system.

The presence of a purulent discharge from the nasolacrimal puncta is consistent with a diagnosis of dacryocystitis, which may be associated with conjunctivitis.

In dogs, dacryocystitis most commonly results from the presence of foreign bodies within the nasolacrimal system. Dacryocystitis is also probably the most common cause of conjunctivitis in rabbits.

Ancillary diagnostic tests

Once a diagnosis of primary conjunctivitis has been reached, and intraocular and systemic disease excluded, a specific aetiological diagnosis should be sought if it is not evident from the examination thus far.

A Schirmer teat test (STT) should be performed in all cases of conjunctivitis, unless specifically contraindicated (such as in the situation of a fragile globe). The test must be performed before application of any eye drops, and before any iatrogenic irritation of the eye.

The strip is placed with its kinked end under the lateral third of the lower eyelid (Figure 7). In dogs, the normal STT I reading is greater or equal to 15mm/min and a reading of less than 10mm/min is diagnostic of keratoconjunctivitis sicca. STT I readings in cats are variable, and should be interpreted in association with clinical signs.

Fluorescein staining is also important in cases of conjunctivitis to rule out corneal ulceration. However, if corneal ulceration is present, the eye is usually much more painful than when the conjunctiva alone is affected. Again, it is important to inspect the cornea under the third eyelid.

The passage of fluorescein from the ocular surface to the ipsilateral nostril (Jones test) may be helpful in evaluating obstruction of the nasolacrimal system. However, passage times are highly variable in dogs and cats. A positive test confirms the patency of the nasolacrimal system, but the lack of fluorescein passage is not conclusive of an obstruction.

Bacterial culture may be helpful in discovering the specific aetiology of conjunctivitis in some cases. There are relatively few primary bacterial pathogens in cats and dogs, and those that exist often require specialised collection and culture conditions (such as *Chlamydophila* species and *Mycoplasma* species).

Bacteria cultured from cases of conjunctivitis often reflect normal conjunctival flora or common opportunistic pathogens, and are unlikely to be the primary cause of disease.

A lack of response to initial empirical topical antibiotic therapy is usually the result of misdiagnosis, rather than the presence of a resistant bacterial conjunctival pathogen.

Samples for bacteriology should be taken before application of local anaesthetic (which may be bactericidal), and the tip of the swab should be moistened with sterile saline before sampling.

Viral testing in small animals with conjunctivitis is most commonly performed in cats, in which FHV-1 is the most common conjunctivitis cause. The gold standard diagnostic test for FHV-1 is polymerase chain reaction (PCR).

Distemper is the most common cause of viral conjunctivitis in dogs, and options for diagnosis include PCR and immunofluorescence assay (IFA) testing. Cytological examination may also reveal epithelial inclusion bodies, but these are often difficult to see. For PCR testing, a good cellular yield is essential and can be achieved by rolling a dry, sterile, cotton swab in the conjunctival fornix. Alternatively, samples can be obtained using a cytobrush.

Cytological and histopathological examination of conjunctival samples is often useful in understanding the cause of disease and in guiding treatment. Samples can usually be obtained during the consultation following application of topical anaesthetic.

Conjunctival brush samples have the advantage of providing a good cellular yield with enhanced preservation. In the absence of a cytobrush, conjunctival scrapings can be readily obtained with the back (blunt) end of a scalpel blade before smearing on to a slide for examination.

Cytological specimens are examined for the presence of inflammatory cells, infectious agents, intracellular inclusion bodies and neoplastic cells. The types of cells commonly encountered in cases of conjunctivitis are illustrated in Table 2.

Treatment

Once a specific diagnosis is reached, appropriate therapy can be provided. If the cause of conjunctivitis is frictional (see Table 1), then this needs to be corrected, which should result in resolution of the disease (such as removal of foreign bodies, surgical correction of entropion and electrolysis for distichiasis). Treatment considerations for conjunctivitis are as follows.

- **Antibiotics**

Topical antibiotic therapy is indicated for primary bacterial conjunctivitis and as prophylaxis against bacterial overgrowth and opportunistic infections while the primary cause of conjunctivitis is being addressed.

The normal conjunctival flora in dogs and cats is predominantly composed of gram-positive bacteria, such as *Staphylococcus* species, and thus empirical therapy should have activity against these organisms. Appropriate first-line choices include fusidic acid, which is usually applied twice daily, and chloramphenicol, which is usually applied four times daily. *Mycoplasma* species are also commonly isolated from the conjunctiva of cats, and *Chlamydophila felis* is a recognised cause of primary conjunctivitis in this species. Topical tetracyclines would be a sensible choice for diseases caused by these organisms, but no ophthalmic products are readily available in the UK.

For feline chlamydial conjunctivitis, systemic doxycycline is the treatment of choice (10mg/ kg/day for 28 days). Side effects include tooth enamel discolouration in growing kittens and oesophageal stricture formation.

As discussed earlier, the lack of response to initial empirical antibiotic therapy usually implies misdiagnosis, rather than the presence of resistant bacteria. In this situation, careful re-evaluation of the patient is paramount, rather than a knee-jerk switch to an alternative topical antibiotic therapy.

• **Antivirals**

FHV-1 is the most common cause of conjunctivitis in cats although infections are usually self-limiting. When conjunctivitis is severe, or if corneal ulceration is present, topical or systemic antivirals are indicated.

Trifluorothymidine has the most potent in-vitro action against FHV-1, and an eye drop formulation can be compounded by eye hospital pharmacies. Ganciclovir also has very good in-vitro activity and a 0.15 per cent ophthalmic gel is commercially available in the UK.

Aciclovir is also commercially available as a three per cent ophthalmic ointment, but this drug has very poor in-vitro activity against FHV-1. Systemic famciclovir has been used in cats with herpesassociated ocular disease, although conclusive data on the efficacy and the appropriate dosing regime of this drug are lacking.

• **Corticosteroids**

Topical corticosteroids are indicated in the presence of immune-mediated and allergic conjunctivitis. They are contraindicated in the presence of corneal ulceration, and should be used with extreme caution, or not at all, in the presence of infection. Dexamethasone at 0.1 per cent is an appropriate choice for immune-mediated ocular surface disease as it is very potent and has limited systemic absorption. It is usually initially applied two to four times daily. Systemic prednisolone has been used successfully in conjunction with azathioprine for ligneous conjunctivitis in dogs.

• **Other immunomodulatory agents**

Topical ciclosporin is the only licensed treatment for canine immune-mediated keratoconjunctivitis sicca and chronic superficial keratitis (“pannus”). It is also useful in treating plasmoma of the third eyelid (“atypical pannus”). Topical 1.5 per cent ciclosporin has also been used successfully in cats with eosinophilic keratoconjunctivitis. Topical ciclosporin is usually applied twice daily.

• **Anti-allergenics**

Systemic antihistamines (such as chlorphenamine) are often useful in managing atopic conjunctivitis. Topical mast cell stabilisers are used to treat human allergic conjunctivitis, but there are no published reports of their use in small animals.

• **Ocular lubricants**

These are indicated in the presence of quantitative or qualitative tear film disturbances associated with conjunctivitis.

The choice of therapy depends on the severity of the tear film deficiency and the component of the tear film that is deficient. In immune– mediated KCS, the aqueous layer of the tear film is deficient. Aqueous preparations, however, are too rapidly lost from the ocular surface to be useful in small animals, as they require very frequent application. Carbomer 980 has mucinomimetic properties and has longer retention than aqueous substitutes. In meibomianitis, there may be a deficiency in the lipid layer of the tear film. Lipid-based substitutes include mineral oil and petrolatum, and have extremely long ocular surface retention times, needing only to be applied three to four times daily.