1969

The Use of Corticosteroids in Ocular Disease of Small Animals

Doug Hildebrand
Iowa State University

Follow this and additional works at: https://lib.dr.iastate.edu/iowastate_veterinarian

Part of the Pharmaceutical Preparations Commons, and the Small or Companion Animal Medicine Commons

Recommended Citation
Hildebrand, Doug (1969) "The Use of Corticosteroids in Ocular Disease of Small Animals," Iowa State University Veterinarian: Vol. 31 : Iss. 2 , Article 3.
Available at: https://lib.dr.iastate.edu/iowastate_veterinarian/vol31/iss2/3

This Article is brought to you for free and open access by the Journals at Iowa State University Digital Repository. It has been accepted for inclusion in Iowa State University Veterinarian by an authorized editor of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
The Use of Corticosteroids in Ocular Disease of Small Animals

Doug Hildebrand*

Introduction

Corticosteroids are of great value in the treatment of inflammatory diseases of the eye. Acute inflammations which are treated early respond rapidly, and relapse is uncommon after therapy is discontinued. Chronic conditions respond more slowly and relapses are much more likely to occur. Used correctly, corticosteroids can improve the chances of successful treatment of many ocular conditions in small animals.

Indications

Corticosteroids are used as a part of the treatment of acute and catarrhal conjunctivitis. Generally, an ointment form containing antibiotics and corticosteroids is used several times per day. Chemosis and injection of the conjunctiva are markedly reduced. Corticosteroids are also used in purulent conjunctivitis. In this disease, corticosteroids are used topically in ointment form with an antibiotic or antibiotic combination. However, there are certain precautions to be taken here. First, the fluorescein stain of the cornea should be done to determine if corneal ulceration is present. Corticosteroids are contraindicated in the presence of corneal ulcers since corticosteroids inhibit epithelization and thus delay wound healing. Also in cats, a conjunctival scrape is indicated before instituting local corticosteroid therapy. The conjunctival scrape is stained with Giemsa stain and examined microscopically for red intracellular inclusion bodies. These inclusion bodies indicate a viral etiology, and corticosteroids would reduce antibody formation in response to the virus, thus making the condition worse.

In follicular conjunctivitis of the third eyelid, corticosteroids are used topically in ointment form to reduce the swelling, edema, and congestion of the third eyelid as well as reduce the catarrhal exudate from the lymphatic tissue of the third eyelid.

Corticosteroids are indicated in some keratopathies. Generally speaking, the result of the fluorescein dye test is the deciding factor in the use of topical corticosteroids. If erosion or ulceration exists, topical corticosteroids are contraindicated generally. The only exception is after corneal trauma or an old corneal ulcer when steroids are used to reduce neovascularization, scarring and pigmentation.

In ulcerative keratitis with panuveitis, corticosteroids are not used topically as a rule, but they may be used systemically. The rationale for their systemic use is that with this method of administration, the concentration of corticosteroids is high...
only in the posterior segment of the eye and that sufficient quantities of corticosteroids to inhibit epithelization of the ulcer are not present in the cornea. However, the quantities at the perilimbal plexus are thought to be sufficient to bring the permeability of these vessels back towards normal, thus allowing the edematous fluid in the corneal stroma to be removed and allows the cornea to become transparent again, reducing the time required for healing.

Another indication for corticosteroids is idiopathic pannus in the German Shepherd. Steroids are used to cause regression of neovascularization and granulation tissue growth. Here steroids are applied topically and also subcapsularly. Subcapsular administration is accomplished by injection beneath Tenon’s Capsule, providing a slow release of corticosteroid and a longer therapeutic effect. It should be remembered that steroids only arrest this disease, they do not cure it.

One of the most important uses of corticosteroids is in the treatment of uveitis. Here early steroid therapy is important so that there is minimal damage to the choroid as a result of the inflammatory reaction. Prednisolone solutions are often used intramuscularly so that high concentrations of steroids are attained in the posterior segment of the eye. Also, subcapsular injections of prednisolone may be used here because of the accompanying interstitial keratitis which is seen frequently with uveitis. Before using steroids subcapsularly, however, a fluorescein dye test should be used to make sure there are no corneal ulcers.

Contraindications

Corticosteroids can complicate any active infection if given systemically. Usually, this can be avoided by the use of effective antimicrobial compounds in conjunction with steroids. However, if the infection is severe or the antibiotic is ineffective, the condition can be worsened or activated.

In diabetes mellitus, systemic steroids are contraindicated due to their glucocorticoid actions, one of which is the hyperglycemic effect. Steroids also complicate hypertension as well as electrolyte imbalances. Also, it should be remembered that they delay wound healing.

The fact that corticosteroids inhibit epithelization of the cornea is well known and well accepted. This makes the diagnosis of corneal ulcers very important since locally applied steroids can seriously prolong the healing of a corneal ulcer or laceration. Local eye infections when treated with corticosteroids may progressively grow worse in the presence of local steroid therapy if specific, effective antibiotics are not used along with the steroid.

One very definite contraindication for corticosteroids is in the uveitis and interstitial keratitis following infectious canine hepatitis. Generally speaking, any viral disease of the eye contraindicates the use of steroids since the body’s defense mechanisms are inhibited by this drug.

Post vaccinal keratitis is another contraindication. The mechanism seems to be a delayed hypersensitive reaction with regional vascular thrombosis and endothelial damage. Corticosteroids, it is believed, would inhibit the natural vascular response of the body resulting in permanent damage to the eye.

Routes of Administration and Dosage

Topical therapy is effective in anterior segment disease including diseases of the lids, conjunctiva, cornea, iris, and ciliary body. Ease of application, relatively low cost, and absence of systemic complications strongly favor local routes whenever they are effective. Unusually stubborn anterior segment diseases may require supplementary systemic, subcapsular, or subconjunctival medication.

Posterior segment diseases such as choroiditis, panuveitis, optic neuritis, and posterior scleritis, are not appreciably affected by topical steroids and require systemic therapy. Oral administration of steroids is one method of attaining systemic therapeutic levels. Oral, peak concentrations are reached in one hour and are about at normal levels in six hours so therapy will be required three or four times each day.

Iowa State University Veterinarian
Dosage will vary with the severity of the disease. The degree of response is directly related to dosage, and therefore, the dose of steroid should be proportional to the severity of the individual disease. For topical use, usually increased frequency of application is equally or more effective than a stronger concentration.

**Discussion**

Many synthetic corticosteroids are available for use in veterinary medicine, as well as cortisone and hydrocortisone. Many of the newer synthetics have tremendous anti-inflammatory effects with minimal effects on electrolyte levels and carbohydrate metabolism. All steroid derivatives have some undesirable side effects, but the proportionate risk of these side effects is less in the newer steroids. The therapeutic response of locally applied corticosteroids seems to require the same amount of concentration regardless of which steroid is used. Hydrocortisone is biologically more active and potent than cortisone and has been demonstrated to be more effective than cortisone against certain superficial eye conditions. For this reason, mainly hydrocortisone is used in ophthalmic ointments and solutions.

Corticosteroids decrease cellular and fibrinous exudation and tissue infiltration, inhibit fibroplastic and collagen-forming activity, inhibit neovascularization, and restore toward normal the excessive permeability of inflamed capillaries. The mechanisms by which these effects are produced are not known but are thought to be indirect, such as suppression of the substances which induce tissue activity in response to inflammation or trauma. The anti-inflammatory effects of steroids are nonspecific, occurring whether the etiology is allergic, traumatic, or infectious.

The anti-inflammatory effects of corticosteroids have been most useful in ocular disease because the delicate and transparent ocular structures are particularly susceptible to functional damage by inflammation and scarring.

In general, therapeutic responses are obtained in inflammations such as uveitis and scleritis and in all forms of ocular allergy. Steroids reduce resistance to many types of such infections except simultaneously with an effective antibiotic or other antibacterial medications. Degenerative diseases are completely refractory to steroids.

Corticosteroids will reduce toward normal the increased capillary permeability characteristic of inflammation, and the resulting edema. This is of therapeutic effect by stopping abnormal cellular and protein leakage into the aqueous humor. The tissue infiltration and surface exudation of neutrophils, lymphocytes and mononuclear cells are markedly inhibited by corticosteroids.

Formation of collagen and fibroplastic activity are definitely inhibited by corticosteroids. This is desirable in the prevention of corneal scarring but is disadvantageous during the healing of surgical wounds.

Despite the general agreement that steroids tend to inhibit wound healing, clinical experience indicates that ocular surgery can be performed with impunity during steroid therapy in moderate doses. However, unless required by severe uveitis or some similar medical indication, steroid therapy is best postponed until several days postoperatively, by which time fibroplastic activity is already well advanced.

One of the most useful therapeutic actions of steroids is in inhibition of neovascularization. Cortisone has a nonspecific vasoconstrictor effect which may contribute to this inhibition of neovascularization, and which may induce regression of existing vessels.

A relatively minor disadvantage of corticosteroids is the inhibition of epithelial and endothelial regeneration.

**REFERENCES**