

NONULCERATIVE KERATITIS

(TYPE OF INFLAMMATION OF THE CORNEA)

BASICS

OVERVIEW

- “Keratitis” is inflammation of the cornea; the “cornea” is the clear outer layer of the front of the eye
- “Nonulcerative keratitis” is any inflammation of the cornea that does not retain fluorescein stain; “fluorescein stain” is a dye that is used to identify ulcers of the cornea—if the very top layer of the cornea has been disrupted (as with an ulcer), the dye will enter the lower layers of the cornea and will cause a temporary stain that glows under an ultraviolet light; in nonulcerative keratitis, the top layer of the cornea is not disrupted, so no dye enters the lower layers of the cornea

GENETICS

- No proven genetic basis in dogs or cats
- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—inherited susceptibility considered in the German shepherd dog

SIGNALMENT/DESCRIPTION of ANIMAL

Species

- Dogs and cats

Breed Predispositions

- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—may occur in any breed; high likelihood in German shepherd dogs and Belgian Tervuren
- Inflammation characterized by the presence of pigment (melanin) that is deposited in the cornea (known as “pigmentary keratitis”)—seen in short-nosed, flat-faced (known as “brachycephalic”) breeds of dogs with inflammation of the cornea due to exposure to air and irritants (known as “exposure keratopathy”) from condition in which the eyelids do not close completely (known as “lagophthalmos”) and tear-film deficiencies; prominent folds of skin around the nose; abnormal eyelashes that turn inward, against the cornea (known as “trichiasis”); notably identified in pugs, Lhasa apsos, shih tzus, Pekingese
- Inflammation usually involving the area where the cornea (clear part of the eye) and the sclera (white part of the eye) come together, characterized by the presence of nodules (condition known as “nodular granulomatous episcleritis”)—may occur in any breed; likely in cocker spaniels, greyhounds, collies and Shetland sheepdogs
- “Dry eye” (known as “keratoconjunctivitis sicca” or “KCS”)—seen in short-nosed, flat-faced (brachycephalic) breeds; notably cocker spaniels, English bulldogs, Lhasa apsos, shih tzus, pugs, West Highland white terriers, Pekingese, Cavalier King Charles spaniels
- Condition in which part of the cornea tissue dies, leaving a pigmented lesion and fluid build-up (known as edema; condition known as “corneal sequestration”)—most prevalent in Persians, Siamese, Burmese, and Himalayans

Mean Age and Range

- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—may occur at any age; higher risk at 4 to 7 years of age
- Inflammation characterized by the presence of pigment (melanin) that is deposited in the cornea (pigmentary keratitis)—may occur at any age
- Inflammation usually involving the area where the cornea (clear part of the eye) and the sclera (white part of the eye) come together, characterized by the presence of nodules (nodular granulomatous episcleritis)—may occur at any age; in collies— young to middle-aged (mean age, 3.8 years)
- “Dry eye” (keratoconjunctivitis sicca or KCS)— usually middle-aged or old
- Herpesvirus in cats—all ages
- Inflammation of the cornea, characterized by the presence of a type of white-blood cell, called an “eosinophil” (condition known as “eosinophilic keratitis”) and condition in which part of the cornea tissue dies, leaving a pigmented lesion and fluid build-up (known as edema; condition known as “corneal sequestration”) in cats—all ages, except newborns

SIGNS/OBSERVED CHANGES in the ANIMAL

- May cause variable discoloration of the cornea
- Variable eye discomfort

Dogs

- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—usually involves both eyes; often symmetrical pinkish white lesions with variable pigmentation; usually seen on the outer and/or lower part of the cornea; third eyelids may be affected and appear thickened or depigmented; white lipid (a group of compounds that contain fats or oils) deposits may be present at adjacent corneal edge; may lead to blindness in advanced disease
- Inflammation characterized by the presence of pigment (melanin) that is deposited in the cornea (pigmentary keratitis)— appears as focal to diffuse brown to black discoloration of the cornea; often associated with encroachment of blood vessels into corneal tissue (known as “corneal vascularization”) or scarring

- Inflammation usually involving the area where the cornea (clear part of the eye) and the sclera (white part of the eye) come together, characterized by the presence of nodules (nodular granulomatous episcleritis)—usually involves both eyes; raised pink to tan lesions of the outer part of the cornea; may be slowly to rapidly progressive; white deposits and encroachment of blood vessels into corneal tissue (corneal vascularization) may occur in adjacent corneal tissue; third eyelids may appear thickened

- “Dry eye” (keratoconjunctivitis sicca or KCS)—variable findings; may involve one or both eyes; discharge from the eye(s) may contain mucus and/or pus; redness of the moist tissues of the eye (known as “conjunctival hyperemia”); encroachment of blood vessels into corneal tissue (corneal vascularization); pigmentation; and variable scarring

Cats

- Herpesvirus (nonulcerative; involves the thick, clear middle layer of the cornea [known as the “stroma”])—may involve one or both eyes; often occurs with ulceration; fluid build-up in the cornea (known as “corneal edema”), infiltrates, encroachment of blood vessels into corneal tissue (corneal vascularization), scarring; may threaten vision, if severe scarring

- Inflammation of the cornea, characterized by the presence of a type of white-blood cell, called an “eosinophil” (condition known as “eosinophilic keratitis”)—usually involves only one eye; appears as raised white, pink, or gray corneal plaque with roughened surface; may retain fluorescein stain at the edge of the lesion

- Condition in which part of the cornea tissue dies, leaving a pigmented lesion and fluid build-up (known as edema; condition known as “corneal sequestration”)—usually involves only one eye, but can involve both eyes; appears as amber, brown, or black oval to circular plaques near the center of the cornea; can vary in size and corneal depth; edges may appear raised because of fluid build-up in the cornea (corneal edema); thickened tissue; encroachment of blood vessels into corneal tissue (corneal vascularization) is variable; may retain fluorescein at edge of lesion

CAUSES

Dogs

- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—presumed to be immune-mediated; altitude and solar radiation increase the likelihood and severity of the disease

- Inflammation characterized by the presence of pigment (melanin) that is deposited in the cornea (pigmentary keratitis)—secondary to any long-term (chronic) corneal irritation; evaluate for primary underlying eye conditions; more frequently associated with exposure corneal disease (exposure keratopathy) and “dry eye” (keratoconjunctivitis sicca or KCS)

- Inflammation usually involving the area where the cornea (clear part of the eye) and the sclera (white part of the eye) come together, characterized by the presence of nodules (nodular granulomatous episcleritis)—presumed to be immune-mediated

- “Dry eye” (keratoconjunctivitis sicca or KCS)—usually caused by immune-mediated inflammation of the lacrimal gland that produces tears (condition known as “dacryoadenitis”)

Cats

- Herpesvirus—believed to be immune-mediated reaction to herpesvirus antigen rather than an actual effect of the viral infection

- Inflammation of the cornea, characterized by the presence of a type of white-blood cell, called an “eosinophil” (condition known as “eosinophilic keratitis”)—unknown; some cats are infected with herpesvirus

- Condition in which part of the cornea tissue dies, leaving a pigmented lesion and fluid build-up (known as edema; condition known as “corneal sequestration”)—unknown; likely due to long-term (chronic) corneal irritation; some cats have history of previous trauma; suggested relationship with previous herpesvirus infection

RISK FACTORS

- Dogs—long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—more likely to occur at high altitudes with intense sunlight

TREATMENT

HEALTH CARE

- Outpatient—generally sufficient

- Inpatient—cases that warrant surgery due to inadequate response to medical therapy

- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—radiation therapy (using β -irradiation with a strontium-90 probe)

- Inflammation characterized by the presence of pigment (melanin) that is deposited in the cornea (pigmentary keratitis)—radiation therapy (using β -irradiation) and freezing (known as “cryotherapy”)

SURGERY

Dogs

- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—surgical removal of the surface of the cornea (known as “superficial keratectomy”) may be performed for severe disease; usually unnecessary; even if surgery is performed, still requires indefinite medical treatment to prevent recurrence

- Inflammation characterized by the presence of pigment (melanin) that is deposited in the cornea (pigmentary keratitis)—surgical removal of the surface of the cornea (superficial keratectomy) may be performed only after initial underlying cause is corrected; surgery only in severe cases in which inflammation threaten vision

- Inflammation usually involving the area where the cornea (clear part of the eye) and the sclera (white part of the eye) come together, characterized by the presence of nodules (nodular granulomatous episcleritis)—surgical removal of the surface of the cornea (superficial keratectomy) is diagnostic; usually unnecessary; only temporarily resolves clinical signs; medical treatment still is required

- “Dry eye” (keratoconjunctivitis sicca or KCS)—surgically move the duct from the parotid salivary gland to the eye (procedure known as a “parotid duct transposition”), the saliva then acts as “tears” in the eye, or permanent partial closure of the eyelids (surgical procedure known as a “tarsorrhaphy”) may be indicated

Cats

- Inflammation of the cornea, characterized by the presence of a type of white-blood cell, called an “eosinophil” (condition known as “eosinophilic keratitis”)—surgical removal of the surface of the cornea (superficial keratectomy) is diagnostic; usually unnecessary; only temporarily resolves clinical signs; medical treatment is preferred

- Condition in which part of the cornea tissue dies, leaving a pigmented lesion and fluid build-up (known as edema; condition known as “corneal sequestration”)—surgical removal of the surface of the cornea (superficial keratectomy) may be curative; recurrence is possible; eye discomfort is primary indication for surgery

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

Dogs

- Long-term (chronic) superficial inflammation of the cornea (keratitis), also known as “pannus”—steroids (1% prednisolone or 0.1% dexamethasone) applied to the eye directly (known as “topical treatment”); 1% or 2% cyclosporine in oil or 0.2% ointment to decrease the immune response, applied to the eye directly (topical treatment); either of these medications can be used alone or in combination for more severe cases; steroid (triamcinolone) injection under the moist tissues of the eye (known as “subconjunctival injection”) can be used in addition to topical therapy in severe cases

- Inflammation characterized by the presence of pigment (melanin) that is deposited in the cornea (pigmentary keratitis)—medications applied to the eye directly (topical treatment) to treat underlying cause; topical steroids, if primary cause is inflammatory; lubricants or cyclosporine, if primary condition is “dry eye” (keratoconjunctivitis sicca or KCS); cyclosporine may be beneficial to reduce pigmentation

- Inflammation usually involving the area where the cornea (clear part of the eye) and the sclera (white part of the eye) come together, characterized by the presence of nodules (nodular granulomatous episcleritis)—steroids and/or cyclosporine applied to the eye directly (topical treatment); systemic azathioprine (a chemotherapeutic agent used to decrease the immune response) may be effective when used alone or in combination with topical medications

- “Dry eye” (keratoconjunctivitis sicca or KCS)—topical 1% or 2% cyclosporine in oil or 0.2% ointment

Cats

- Herpesvirus—topical (applied to the eye directly) antiviral agents (such as trifluridine—Viroptic®); for disease of the thick, clear middle layer of the cornea (the stroma); topical steroids can be used at the same time as antiviral agents, but with caution; oral lysine may be of benefit; oral antiviral agents should be used with extreme caution because of bone-marrow suppression, leading to low red-blood cell and low white-blood cell counts, that could proceed to death

- Inflammation of the cornea, characterized by the presence of a type of white-blood cell, called an “eosinophil” (condition known as “eosinophilic keratitis”)—steroids (1/8 to 1% prednisolone or 0.1% dexamethasone) applied to the eye directly (topical treatment) usually causes remission; steroids should be used with caution and the patient monitored for ulceration or worsening of clinical signs; topical antiviral medications can be used in combination with steroids, if herpesvirus infection is suspected; for severe cases that do not respond to medical treatment, megestrol acetate (Ovaban®) can be considered; megestrol acetate has side effects that you should discuss with your pet’s veterinarian

- Condition in which part of the cornea tissue dies, leaving a pigmented lesion and fluid build-up (known as edema; condition known as “corneal sequestration”)—triple antibiotic applied to the eye directly (topical treatment) as directed by your pet’s veterinarian for associated corneal ulceration; artificial tear lubrication may be beneficial for relieving discomfort; topical antiviral medications can be used, if herpesvirus infection is suspected; topical 1% atropine ointment may be used to treat pain associated with coexistent inflammation of the front part of the eye, including the iris (known as “anterior uveitis”), if clinical signs suggestive of uveitis are present

FOLLOW-UP CARE

PATIENT MONITORING

- Periodic eye examinations to evaluate effectiveness of treatment; examine at 1 to 2 week intervals, gradually lengthening the interval with remission or resolution of clinical signs

POSSIBLE COMPLICATIONS

- Continued eye discomfort
- Visual defects

- Blindness in severe cases

EXPECTED COURSE AND PROGNOSIS

- Depend on disease and underlying cause

KEY POINTS

Dogs

- All patients require lifelong treatment
- Nonulcerative keratitis is controlled rather than cured
- Surgery may be needed for treatment; some animals will continue to need medical treatment following surgery

Cats

- Herpesvirus—eye discomfort and inflammation of the cornea (keratitis) often recur
- Inflammation of the cornea, characterized by the presence of a type of white-blood cell, called an “eosinophil” (condition known as “eosinophilic keratitis”)—disease controlled rather than cured
- Condition in which part of the cornea tissue dies, leaving a pigmented lesion and fluid build-up (known as edema; condition known as “corneal sequestration”)—the pigmented lesion (known as a “sequestrum”) may slough spontaneously; may require months to years of treatment and clinical course may be prolonged without surgery; removal of sequestrum by surgical removal of the surface of the cornea (superficial keratectomy) may be incomplete and it may recur postoperatively

