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Keratoconjunctivitis Sicca in Dogs

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Abstract

Keratoconjunctivitis sicca (KCS), or dry eye syndrome, is a common ocular condition in canines, characterized by inadequate tear film leading to corneal and conjunctival inflammation. Causes include congenital factors, breed predisposition, and immune-mediated issues. Untreated, KCS can lead to corneal ulceration, scarring, and vision loss. Diagnosis involves Schirmer Tear Test readings and clinical observation. Histological examination reveals mononuclear cell infiltration in lacrimal glands. Treatment includes medical management with tear stimulants, anti-inflammatory medications, and surgical interventions. Topical medications like lubricants and immunomodulators are crucial for managing symptoms and preserving ocular health. Understanding KCS is essential for effective treatment and improving the quality of life for affected dogs.

Keratoconjunctivitis sicca (KCS) or dry eye syndrome, is an inflammation of the cornea and conjunctiva resulting from the inadequacy of pre-corneal tear film (PTF). Various purported causes of KCS in canines include congenital tear deficiency, breed predisposition, drug-induced lacrimal failure, metabolic, infectious, iatrogenic, idiopathic, neurogenic diseases, radiation, canine distemper, immune-mediated issues, trauma, chronic blepharo-conjunctivitis, and uncorrected nictitans gland prolapse. Tear film deficiencies can lead to dehydration and malnutrition of the corneal and conjunctival epithelium, resulting in recurrent corneal ulceration and infection. Eventually leading to corneal scarring, hyperpigmentation, neovascularization, hyperkeratinization and vision loss. The anterior cornea becomes thickened with numerous layers of keratinized epithelium, epithelial pegs, cellular infiltrates, and extensive vascularization of the anterior stroma. In contrast, acute cases are more often accompanied by severe signs of discomfort and often central corneal ulceration and perforation.

The cornea is a transparent and avascular connective tissue, serving as an ocular structural barrier to prevent infections. The cornea has five layers: Anterior epithelium, Basement membrane, Connective tissue stroma, Descemet membrane, and Endothelium. Intrinsic and extrinsic factors contribute to the specific shape and curvature of the cornea.

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Keratoconjunctivitis sicca is a primarily immune-mediated and degenerative disease that directly affects the patients' vision and quality of life is a major cause of ocular morbidity in dogs and humans, and dogs are excellent animal models for understanding this disease.

Ocular complications in DED are characterized by events affecting the ocular surface. Progressive corneal disease (vascularization, pigmentation and corneal edema), accompanied or not with corneal epithelium loss, ocular pain and decreased vision are common disorders. Corneal and conjunctivitis in dogs with dry eye is mainly characterized by T-cell infiltration. KCS can be classified into two types: one type has symptoms such as inadequate or decreased tear secretion, while the other type has symptoms such as excessive tear evaporation, which is common with brachycephalic breeds.

There are many causes of KCS in canine, such as congenital tear deficiency, breed predisposition, drug-induced lacrimal failure, metabolic, infectious, iatrogenic, idiopathic, neurogenic diseases, radiation, canine distemper, immune-mediated, trauma, chronic blepharo-conjunctivitis, and uncorrected nictitans gland prolaps.

Canine KCS is diagnosed with Schirmer Tear Test readings of less than 15 mm/minute in cases accompanied by appropriate clinical signs.

The dog has 2 major lacrimal glands, with similar anatomy. The most common lesion was multifocal mononuclear cell infiltration with varying degrees of fibrosis. Paradoxically, many glands had few focal inflammatory lesions and the majority of glands had large areas of apparently nonfunctional acini. Lesions were classified into 4 stages of progression. In stage 0 lesions were absent on light microscopy and degenerative acinar changes such as the loss of secretory granules, and nuclear degeneration were seen on electron microscopy. In stage 1, inflammatory lesions appeared to begin as small multifocal mononuclear infiltrates and progress to stage 2; large, confluent areas of mononuclear infiltrates. Lesions classified as stage 3 had diffuse, coalescing mononuclear inflammatory lesions, fibrosis and atrophy of the acinar elements. Contrary to the conventional belief in human medicine, that lacrimal glands in KCS patients have progressive, irreversible atrophy, we contemplated that glands with stage 0-2 lesions could regain function following acinar repair and regeneration, if it were possible to stop the inflammatory response.

Alternative method for the estimation of tear production in the dogs is the phenol-red thread test. The principle of this technique is similar to that of the STT but this test lasts for only 15 seconds. Reference values for dogs ranges from 30 to 38mm/15 seconds. The diagnosis of a

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corneal ulcer is made on the basis of these clinical signs and the retention of topically applied fluorescein dye by the corneal stroma.

Treatment for KCS includes both medical and surgical therapy. Tear stimulants and tear replacements are the foundations of medical management for KCS. Anti-inflammatory medications and topical antibiotics are also frequently employed. Topical medications, including ocular lubricants, antibiotics, corticosteroids, mucolytics, pilocarpine, and immunomodulators like cyclosporine, pimecrolimus, and tacrolimus, are integral to the treatment plan, enhancing tear production and modulating the immune response.

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