Past, Present, Future : Corneal ulcer in dogs

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Cornea

Cornea is considered part of ocular adnexa. Not only it reflects light onto ocular media, it helps to protect the eyeball. Corneal ulcer, ulcerative keratitis, is one of the major causes of impairment and blindness. In dogs, it can be primary or secondary to other ophthalmic disease. Common causes of corneal ulcer are trauma and inflammation. Organism can invade corneal stroma if corneal epithelium is compromised.

Ophthalmic examinations for corneal disorder

To achieve success in treatment of corneal ulcer, detailed history taking and thorough ophthalmic examinations are required. Several findings are diagnosed upon initial routine light room examinations. Various light sources are available for corneal examination. Transilluminator offers brighter and more focused light beam than penlight or flash light. Fluorescein staining test is still recommended if stromal ulcer is suspected. It helps to indicate size and shape of stromal ulcer when fluorescence with cobalt filter is used. In non-healing corneal ulcer on the other hand, fluorescein dye will migrate under overhanging border of epithelium and stain the anterior stroma. When ulcer is associated with infection, microbiological work-up should be considered. Scraping at the edge and base of the ulcer; organism can microscopically be confirmed using Gram’s or Giemsa staining method. Culture and sensitivity should be considered if severe ocular pain persists.

Figure 1 Non-healing corneal ulcer in dog.

Treatment

Treatment of corneal ulcer can be successful using medical or surgical therapy or combination. Although complete microbiological work-up with smear result is the best initial approach, empirical therapy is rather preferable for clinicians. If lesion is small and unlikely associated with risk factor for unusual microorganism, broad spectrum antibiotic may be started. Among other bacteria, Staphylococcus aureus is the most frequent Gram positive organism associated with canine ulcerative keratitis, while that of Gram negative one is Pseudomonas aeruginosa. Fluoroquinolone has become popular in veterinary practice due to its efficacy to eradicate both Gram positive and Gram negative bacteria. If ulcer rapidly progresses with more than 6 mm in diameter, involves into deeper stroma or clinical examination suggests unusual pathogens, microbiological investigation should be done. Local release of enzymes liberated by dying cornea, inflammation and pathogenic organism during disease progression should be additionally treated with anti-collagenase agents. Adequate and intensive compliance of topical medication is part of treatment success.

In non-healing corneal ulcer, redundant epithelial border must be removed. Several techniques have been developed in order to make environment favorable for corneal epithelial adhesion. Substances that help to promote epithelial growth may beneficial for stable adhesion and complete healing.

Surgery is highly recommended in an uncontrolled, severe ulcer. Supportive therapy such as nictitating membrane flap or tarsorrhaphy, are simple to apply. The use of conjunctival autograft provides additional tissue to strengthen the weak area and prevent corneal perforation. In small diameter, deep corneal stromal ulcer, corneal tissue adhesive can be used. Several steps are important to develop materials that have low toxicity to the cornea. Biomaterials have come to play an important role for transplantation in larger corneal defect. To preserve vision in dogs with large deep corneal ulcer or corneal perforation, lamellar or full-thickness keratoplasty is under developing.
Prevention

Early recognition of ocular pain by owners is one of the major clues of treatment success. As a veterinarian, the more accurate diagnosis and the sooner prompt treatment we can provide, the higher satisfactory result we will accomplish.

References

2. Morales et al., 2009. Proceedings of the 34th WSAVA Congress; Brazil.