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Clinical diagnosis and therapeutic management of ulcerative keratitis in a Shih Tzu dog using conventional therapy and platelet-rich plasma: A case report

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Abstract

Ulcerative keratitis is a common ophthalmic emergency in dogs that may rapidly progress to vision-threatening complications if not diagnosed and treated promptly. A seven-year-old intact male Shih Tzu dog weighing 7.8 kg was presented with redness, excessive lacrimation, ocular discharge and corneal opacity of the right eye. Ophthalmic examination revealed conjunctival congestion, corneal edema and superficial corneal neovascularization. Schirmer tear testing, fluorescein staining and slit-lamp biomicroscopy were performed to evaluate the lesion. Based on clinical and diagnostic findings, the case was diagnosed as unilateral ulcerative keratitis. Therapeutic management included topical atropine, moxifloxacin eye drops, lubricating eye drops, systemic supportive therapy and adjunctive platelet-rich plasma eye drops. Progressive healing was observed during follow-up, resulting in complete corneal epithelialization and preservation of vision. The case highlights the importance of early diagnosis and integrated therapeutic management for successful treatment of canine corneal ulceration.

Keywords: Ulcerative keratitis, corneal ulcer, fluorescein staining, platelet-rich plasma, Shih Tzu

Introduction

Ulcerative keratitis is one of the most frequently encountered ophthalmic disorders in dogs and is characterized by disruption of the corneal epithelium with varying degrees of stromal inflammation. The condition is associated with ocular pain, conjunctival hyperemia, lacrimation, corneal edema and visual impairment. If left untreated, corneal ulceration may progress to stromal melting, descemetocoele formation, corneal perforation and blindness (Gelatt 2021; Gilger and Kern, 2019) [3, 4].

Brachycephalic breeds such as Shih Tzus are particularly predisposed to corneal ulceration because of prominent globes, shallow orbits, lagophthalmos and decreased corneal sensitivity, which increase corneal exposure and susceptibility to trauma (Packer *et al.*, 2015; Williams, 2017) [6, 7]. The present report describes the diagnosis and successful management of ulcerative keratitis in a Shih Tzu dog using conventional medical therapy and adjunctive platelet-rich plasma.

Materials and Methods

A seven-year-old intact male Shih Tzu dog weighing 7.8 kg was presented to the Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, Hyderabad, with ocular discomfort and corneal opacity of the right eye. Detailed ophthalmic examination was performed, including Schirmer tear testing, fluorescein staining and slit-lamp biomicroscopy. Tear production was measured using standard Schirmer tear test strips. Fluorescein staining was performed using sterile ophthalmic fluorescein strips to detect corneal epithelial defects. Slit-lamp biomicroscopy was used to assess ulcer depth, stromal involvement, vascularization and associated inflammatory changes. Platelet-rich plasma eye drops were prepared aseptically

from autologous blood and incorporated into the treatment protocol. Clinical response was evaluated through serial ophthalmic examinations and repeat fluorescein staining during follow-up.

Case History and Clinical Examination

A seven-year-old intact male Shih Tzu dog weighing 7.8 kg was presented to the Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, Hyderabad, with a history of redness, excessive tearing, ocular discharge and cloudiness of the right eye of one-day duration. The owner reported sudden onset of signs accompanied by ocular discomfort. The dog had been treated for tick infestation approximately one month before presentation. Appetite, water intake, urination and defecation were normal.

General clinical examination revealed an alert and responsive animal with a rectal temperature of 102.6°F. Mucous membranes were pink and moist, and capillary refill time was less than two seconds. No systemic abnormalities were detected.



Fig 1: Right eye showing conjunctival congestion, corneal edema and corneal opacity at presentation

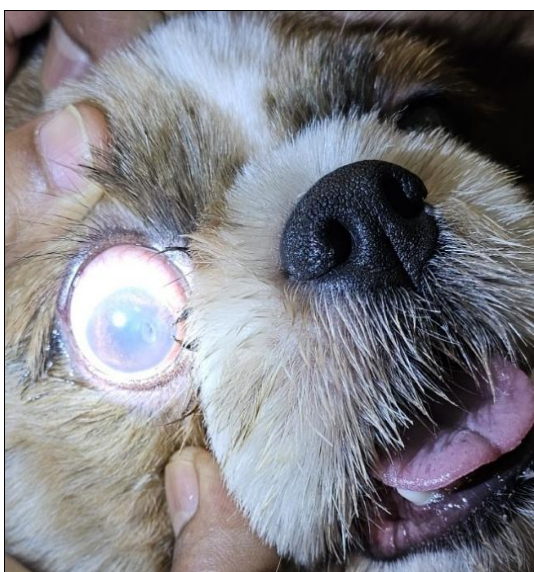


Fig 2: Central corneal ulcer with stromal opacity and superficial corneal neovascularization

Ophthalmic examination of the right eye revealed marked conjunctival hyperemia, episcleral vessel congestion, excessive lacrimation, mild blepharospasm and mucopurulent ocular discharge. Diffuse corneal edema with focal corneal opacity involving the central corneal region was evident. Superficial corneal blood vessels extending from the limbus toward the lesion indicated active corneal neovascularization. The affected eye exhibited signs of pain and irritation characterized by excessive tearing and partial eyelid closure. Neuro-ophthalmic examination revealed positive menace response, palpebral reflex and blink reflex, indicating preservation of visual function. Pupillary light reflex was reduced in the affected eye.

Diagnosis

A Schirmer tear test was performed and tear production was found to be within normal physiological limits, thereby ruling out keratoconjunctivitis sicca as an underlying cause (Gelatt *et al.*, 2021) [3].

Fluorescein dye staining using sterile ophthalmic strips showed intense retention of dye over the affected corneal region, confirming disruption of the corneal epithelium and exposure of the underlying stroma (Maggs *et al.*, 2013) [5].

The lesion was characterized by epithelial loss, stromal edema, corneal haze and localized inflammatory infiltration. Superficial corneal vascularization extending from the limbal region toward the ulcer bed was evident. No evidence of stromal melting, descemetocele formation, corneal perforation, hypopyon, anterior chamber involvement or other intraocular abnormalities was observed.

Further evaluation by slit-lamp biomicroscopy revealed a superficial to mid-stromal corneal ulcer involving the central cornea. The lesion was characterized by epithelial loss, stromal edema, corneal haze and localized inflammatory infiltration. Superficial corneal vascularization extending from the limbal region toward the ulcer bed was evident (Gilger and Kern, 2019) [4].

Based on the history, clinical signs, Schirmer tear test findings, positive fluorescein dye staining and slit-lamp biomicroscopic examination, the case was diagnosed as:

Unilateral Ulcerative Keratitis with Superficial Corneal Neovascularization of the Right Eye in a Shih Tzu Dog



Fig 3: Slit-lamp biomicroscopic examination of the right eye for assessment of corneal ulcer depth, stromal involvement and associated inflammatory changes



Fig 4: Application of a fluorescein ophthalmic strip for tear film assessment and detection of corneal epithelial defects

Treatment and Outcome

Therapeutic management was initiated with meloxicam (Melonex) administered subcutaneously at 0.2 mg/kg body weight as a single dose to control ocular pain and inflammation. Placentrex (0.5 ml, Intramuscularly) was administered as supportive regenerative therapy. Ivermectin (Neomec) was administered subcutaneously at 0.2 mg/kg body weight in view of the recent history of ectoparasitic infestation. Topical ophthalmic therapy consisted of 1% atropine sulphate eye drops instilled every 8 h for three days to provide cycloplegia and alleviate ciliary spasm. Topical moxifloxacin eye drops instilled 6 times a day for 7 days to prevent proliferation of ulcer. Hyaluronic acid lubricating eye drops were administered six times daily for 14 days to maintain corneal hydration and promote epithelial healing. In addition, autologous platelet-rich plasma (PRP) eye drops were applied four times daily for 14 days as an adjunctive regenerative therapy to enhance corneal repair. Oral nutritional supplementation (Optiset) was provided once daily for 15 days. An Elizabethan collar was advised throughout the treatment period to prevent self-trauma and facilitate uninterrupted corneal healing.

Marked clinical improvement was observed within one week of treatment. Conjunctival congestion, ocular discharge, blepharospasm and corneal edema were substantially reduced. Progressive epithelialization of the ulcerated corneal surface was evident during follow-up examinations. Repeat fluorescein staining demonstrated a gradual reduction in dye retention, indicating successful restoration of corneal epithelial integrity. Complete healing of the corneal ulcer occurred without stromal melting, descemetocoele formation, corneal perforation or visual impairment. The dog recovered uneventfully with preservation of corneal transparency, integrity and vision.

Discussion

Ulcerative keratitis is a common ophthalmic emergency in dogs and is particularly prevalent in brachycephalic breeds owing to their anatomical predisposition to corneal trauma and exposure-related injury (Packer *et al.*, 2015; Williams, 2017) [6, 7]. In the present case, characteristic clinical signs, positive fluorescein staining and slit-lamp findings facilitated rapid diagnosis and early intervention.

Fluorescein dye staining remains one of the most reliable chairside diagnostic tests for confirming corneal epithelial defects, while slit-lamp biomicroscopy provides valuable

information regarding ulcer depth, stromal involvement, vascularization and prognosis (Maggs *et al.*, 2013; Gelatt *et al.*, 2021; Gilger and Kern, 2019) [5, 3, 4]. The absence of stromal melting, descemetocoele formation and corneal perforation suggested a favorable prognosis.

The successful clinical outcome was attributed to early diagnosis and prompt multimodal therapy. Atropine provided cycloplegia and pain relief, lubricating eye drops promoted epithelial regeneration, and platelet-rich plasma supplied biologically active growth factors that may enhance epithelial proliferation, stromal repair and corneal wound healing (Anitua *et al.*, 2015; Alio *et al.*, 2017) [2, 1]. Progressive reduction in fluorescein uptake and restoration of corneal integrity during follow-up supported the effectiveness of the therapeutic regimen.

Conclusion

A case of unilateral ulcerative keratitis in a seven-year-old Shih Tzu dog was successfully diagnosed using clinical ophthalmic examination, Schirmer tear testing, fluorescein dye staining and slit-lamp biomicroscopy. Early therapeutic intervention comprising topical atropine, antimicrobial medication, ocular lubricants, systemic supportive therapy and adjunctive platelet-rich plasma resulted in complete corneal healing and preservation of vision. The case highlights the importance of prompt diagnosis and comprehensive therapeutic management in achieving favorable clinical outcomes in canine corneal ulceration.

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Animal Ethics Statement

The animal described in this report was presented to the Veterinary Clinical Complex for routine diagnosis and treatment. All procedures were performed as part of standard veterinary clinical practice with the owner's informed consent. No experimental procedures were conducted on the animal.

Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this manuscript.

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