

AEROMONAS HYDROPHILA KERATITIS IN FRESHWATER TURTLES

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Abstract

Two privately owned semiaquatic freshwater turtles, 1 Chinese striped-neck turtle (*Ocadia sinensis*) and 1 Chinese box turtle (*Cuora flavomarginata*), presented with unilateral, white, corneal opacities consistent with keratitis. Under sedation the corneal lesions were debrided and samples were collected for cytology and bacterial culture. Cytology of the corneal lesions in both cases were similar, showing a monomorphic population of large Gram-negative rods. Aerobic bacterial culture revealed pure and heavy growth of *Aeromonas hydrophila* in both turtles. In both cases treatment was successful and consisted of corneal debridement followed by topical treatment with antimicrobial drugs. Antibioitic selection was based on susceptibility testing and resolved the corneal lesions with no reoccurrence of the condition reported. Primary keratitis has been rarely described in reptiles, with no apparent publications identifying *A. hydrophila* as a primary pathogen associated with keratitis in reptiles. In humans, *A. hydrophila* has been identified in several cases of keratitis, usually following a traumatic event within an aquatic environment. Copyright 2015 Elsevier Inc. All rights reserved.

Key words: *Aeromonas hydrophila*; keratitis; freshwater turtles; Chinese stripe-neck turtle; Chinese box turtle

A 9-year-old female Chinese striped-neck turtle (*Ocadia sinensis*) presented for evaluation of unilateral whitish plaques on the right eye of 4 weeks duration, reduced appetite, and 5 months of decreased activity. The turtle had a 3-year history of laying 3 clutches (3 to 4 eggs/clutch) per year. The patient's diet consisted of an unknown commercial pelleted turtle diet with no additional supplements. The turtle was maintained with another turtle of the same species in a large fish tank, which was supported with a water filter system and no heat source. The turtle and the conspecific had no previous medical history.

On physical examination the turtle weighed 2.26 kg, and was bright, alert, and responsive. On coelomic palpation, multiple mineralized eggs were palpable. Oral examination was normal. The corneal surface of the right eye was partially covered by an opaque lesion covering > 50% of the cornea, (Fig. 1). There was a superficial, white opacity with well-demarcated denser, irregular-white superior edge, and inferior rim typical of the appearance of deposit, over a background—hazy

blue to grey-white—softer opacity consistent with infiltrate and edema. Examination of the remainder of the anterior segment and the posterior segment of the right eye, as well as the left eye, were normal. Corneal fluorescein dye uptake was negative in both eyes. To perform further diagnostic procedures, the turtle was sedated using midazolam (1 mg/kg) and medetomidine (0.1 mg/kg) administered subcutaneously, achieving good sedation within

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30 minutes of administration. Results of a complete blood cell count and plasma biochemistry panel were unremarkable. Whole body radiographs revealed 15 mineralized and normally shaped eggs.

A topical anesthetic (proparacaine hydrochloride) was applied to the right eye. The corneal surface was flushed with 6 mL of sterile 0.9% NaCl solution, followed by sampling with a sterile cotton swab, which was submitted for aerobic bacterial culture and sensitivity testing. Using the end of a #15-scalpel blade, a corneal scraping was performed to collect a sample of the lesion for cytologic evaluation (as well as reduce burden of disease and promote healing). An ophthalmic ofloxacin ointment was applied to the corneal surface of the right eye. Sedation was reversed with atipamezole (0.5 mg/kg) and flumazenil (0.05 mg/kg) subcutaneously, and the patient recovered from sedation uneventfully and was discharged to the owner with the instructions to apply the ofloxacin ointment 3 to 4 times daily until the scheduled reexamination in 7 days.

Cytological examination (diff quick and Gram's stain) of the corneal scraping revealed a monomorphic population of large Gram-negative rods and corneal epithelial squamous cells. Aerobic bacterial culture grew pure and heavy growth of *Aeromonas hydrophila*, susceptible to multiple antibiotics including aminoglycosides and fluoroquinolones. At the time of the patient's re-examination 7 days after initial presentation, the corneal lesion had significantly reduced in size. The turtle was examined again a year later for a history of anorexia. The right eye, including the cornea, was normal upon re-examination.

CASE 2

An adult female of unknown age Chinese box turtle (*Cuora flavomarginata*) was presented for evaluation of a white opacity on the right eye of 1-week duration. No previous ocular treatments had been performed. The animal had a decreased activity level with normal appetite and defecation. The patient had a 5-year history of laying clutches of 3 to 4 eggs each, with the most recent clutch being 4 days before presentation. It was housed with another conspecific in a plastic tank of unknown size with shallow water, no dry docking location, no heat source, and no ultraviolet B light for the past 15 years. The turtle's diet was not provided.

On physical examination the turtle weighed 0.62 kg, and was bright, alert, and responsive.



FIGURE 1. Photograph of a female Chinese striped-neck turtle (*Ocadia sinensis*) diagnosed with unilateral keratitis associated with *Aeromonas hydrophila*.

Physical examination was unremarkable except for bulbar conjunctival hyperemia and injection and a centrally located, dense, irregular, grey-white, superficial corneal opacity with peripheral corneal vascularization and edema of the right cornea, which was fluorescein dye positive (Fig. 2). Hypopyon was also present, settled in the inferior anterior chamber. The remainder of the examination of the eye was limited owing to corneal disease. The left eye was within normal limits. An initial clinical diagnosis of keratitis with infiltrate and deposit was made, and further diagnostic evaluation recommended to the owner to identify the underlying disease etiology.

The owner initially declined corneal sampling for cytology and aerobic bacterial culture, therefore the animal was treated empirically with ofloxacin ointment 3 to 4 times daily until being rechecked 7 days later. The animal was re-presented 7 days



FIGURE 2. Photograph of the eye of female Chinese box turtle (*Cuora flavomarginata*) diagnosed with unilateral keratitis associated with *Aeromonas hydrophila*.

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