A Case Report

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A CASE OF Aeromonas hydrophila INFECTION DUE TO CAPTIVITY-INDUCED STRESS
IN A SPECTACLED CAIMAN (Caiman crocodilus)

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ABSTRACT

Aeromonas hydrophila is a facultative anaerobic, Gram-negative bacterium often regarded as an opportunistic pathogen in animals. A 4-year-old male spectacled caiman (Caiman crocodilus) died after 4 days of anorexia and depression. Necropsy was performed during which mild swelling and ash gray discoloration of the liver was observed. Additionally, the gall bladder was enlarged and elongated. Rod-shaped bacteria were found in the liver by Giemsa staining and identified as A. hydrophila. The animal had been exposed to stressful conditions prior to death, and decreased immune system functioning may have contributed to A. hydrophila infection of the animal.

Key words: Aeromonad, exhibition stress, pathology, spectacled caiman.

INTRODUCTION

Aeromonas hydrophila is a facultative anaerobic, oxidase-positive, Gram-negative bacterium that naturally inhabits aquatic environments (Park et al., 2011). Aeromonads have been reported as pathogens in fish, amphibians and reptiles (Harikrishnan and Balasundaram, 2005). Infection with Aeromonas spp. causes hemorrhagic and ulcerative disease, furunculosis and septicemia in animals (McCoy, 1983). Here, we report a rare case of A. hydrophila infection in a captive spectacled caiman following exposure to stress due to exhibition at a zoo. This type of stress has not been previously described as a risk factor for Aeromonas infection.

Case Report: A 4-year-old male spectacled caiman (Caiman crocodilus) had a 4-day history of anorexia and depression but did not appear to be suffering from any other conditions aside from those signs. The animal was housed in an enclosed facility at Daejeon O-World Theme Park located in the middle of Korea (36°17′N, 127°23′E), and was fed a diet of chicken and pork. The animal was treated with dexamethasone (0.25 mg/kg, Dexorone, Handong Pharmacy, Korea) and multi-vitamins (1 ml/kg, Aminolite, Boehringer Ingelheim, Germany) delivered via intramuscular injection. However, the animal was found dead following the 3-day treatment period.

A necropsy was performed according to a standard protocol, and the liver was submitted to the laboratory housed at the theme park for bacteria culturing. The carcass had a normal appearance except for abscesses that were located bilaterally in the abdominal subcutaneous areas. The trachea and stomach were empty except for yellow-green bile. Mild swelling and ash gray discoloration of the liver was observed, and the gall bladder was enlarged and elongated (Fig. 1). Giemsa staining revealed the presence of rod-shaped organisms tinted violet in the liver parenchyma (Fig. 2).

The liver was cultured on blood agar (Asan Pharmacy, Korea) and MacConkey agar (Difco, USA) at 37°C for 18 h. A pure culture of hemolytic, milky colonies was isolated on both type and MacConkey agar. A pure culture of hemolytic, milky colonies was isolated on both type and MacConkey agar. The colonies were composed of rod-shaped bacteria. These microorganisms were identified as A. hydrophila using a biochemical API 20NE identification kit (Biomerieux, France).

DISCUSSION

Aeromonas infection in aquatic animals has been recognized for over 100 years, but is not as widely observed in other vertebrates (Harikrishnan and Balasundaram, 2005). A. hydrophila has been reported to cause septicemia in several types of animals (Ocholi and Spencer, 1989; Ocholi and Kaledjaye, 1990; Pasquale et al., 1994; Krovec et al., 1998; Harrison et al., 2001) along with mastitis, septic arthritis and abortion (Willoughby et al., 1989; Duthie et al., 1995).

There are a few reports of crocodiles with septicemia associated with A. hydrophila infection in zoos (Turutoglu et al., 2005; Roh et al., 2011). Furthermore, A. hydrophila was isolated from 85% of the oral cavities of American alligators (Gorden et al., 1979). A. hydrophila is ubiquitous in the natural habitats of alligators and crocodiles, but does not appear to be pathogenic under normal conditions. However, stress factors such as trapping, handling and thermoregulation...
may promote the rapid bacteria proliferation, thereby leading to disease development (Gorden et al., 1979; Roh et al., 2011).

The deceased spectacled caiman described in the current case was raised and exhibited in a zoo for 3 years. The source and route of infection were not determined. However, oral infection with A. hydrophila may have been attributed to the consumption of contaminated food. Among the factors presented in the case history, stress caused by exhibition and captivity that decreased immune system functioning may have contributed to infection of the animal.

Our results are in agreement with those of previous studies (McColl, 1983; Rideout et al., 1985; Kinney et al., 1999; Dror et al., 2006) showing that stress hormones such as epinephrine and norepinephrine increase the growth and virulence of bacteria. Increased bacterial growth may alter the environment in a manner that promotes infection of an animal under stressful conditions. In particular, the small intestine is richly innervated with noradrenergic nerve fibers. Secretion of norepinephrine by sympathetic nerve fibers is increased under stressful conditions and this response can affect susceptibility to disease (McColl, 1983; Rideout et al., 1985; Kinney et al., 1999). Accordingly, alleviation of captivity-induced stress in zoo animals by providing a more relaxing environment and minimizing exposure to stressors can be effective for reducing bacterial infections (Carlstead and Shepherdson, 2000).

Fig. 1: Swollen and discolored liver along with the enlarged gall bladder.

Fig. 2: Rod-shaped bacteria in the liver were tinted violet by Giemsa stain (1,000x magnification).
REFERENCES


