

Wen overgrowth in Ranchu goldfish (*Carassius auratus*)

Case report

Abstract

Lionhead goldfish possess wen, a unique ornamental epithelium tissue. Wen overgrowth often impacts fish's physical abilities and requires veterinary intervention. The present case describes the history, presentation, and treatment performed on a juvenile Ranchu goldfish.

Introduction

Goldfish are a domesticated fish with a long history of selective breeding for the purpose of aesthetic enhancement, leading to a significant scale of morphological variation amongst modern breeds.¹ Lionhead goldfish (Orandas, Ranchus, and Lionheads) possess a distinctive feature known as Wen, an avascular non-ciliated epithelium tissue growth in their cranial region.⁶ This aesthetic, the otherwise benign anatomical feature becomes problematic if it grows extensively as it can cause obscured vision, airway (operculum) obstruction, and abnormal buoyancy/balance issues.⁶ The aim of this case report is to highlight a common treatment approach for overgrown wen in Lionhead goldfish.

Case presentation

History

A 1.5-year-old male Ranchu goldfish (*C.auratus*) was presented to the clinic for evaluation of wen overgrowth after an a-week history of uncoordinated swimming patterns reported by the owner. The patient has been treated for wen overgrowth and an associated bilateral corneal ulceration 7 months prior to the consultation.

The fish has been housed with 5 other goldfish in a 690-litre glass tank (approximately 600 litre of water) with a four-foot LED light along the top. The water temperature was maintained above 18 degrees Celsius (°C) using a commercial water heater, and water filtration was regulated by an external canister filter and an internal UV filter. The tank was decorated using several species of live aquatic plants and sand substrate. One-third of the tank water used to be replaced weekly using dechlorinated water. (Water quality was maintained via routine water changes and filters etc)

Clinical presentation

Vital parameters and water parameters were within normal ranges of *Carassius spp.*⁵ The distance observation confirmed the patient's poor navigation skills. The physical examination revealed a bilateral periocular proliferation of the wen tissues extending over the operculum with complete obscurity of the eyes.

The owner has opted for a symptomatic treatment by surgical removal of the excess tissues without further investigation.

Treatment

1. Anaesthesia

The fish was induced in a six-litre of aerated water (dechlorinated freshwater) mixed with alfaxalone (Alfaxan® Multidose; Jurox Animal Health) (2mg/L) at 22 °C for approximately ten minutes with no clinical effect. The solution was titrated with additional doses of alfaxalone at the rate of 2mg/L per five minutes to reach the surgical plane of anaesthesia: reduced opercular movement, complete loss of balance and muscle tone and reflex/response to stimuli.^{3,7} The desired effects were achieved at 6mg/L.

The fish was positioned in the lateral recumbency with the head elevated above the water in a shallow container for the duration of the procedure. The anaesthetic was maintained using a non-recirculating system where the feeding tube was used to pass a fresh solution of aerated anaesthetic water (4mg/L alfaxalone at 22°C) to the gills through the mouth at the flow rate of 1L/min/kg. The ultrasonic Doppler probe was placed over the heart to monitor the cardiac activities and anaesthetic depth was evaluated by a visual assessment of muscle tone, reaction to stimuli, and opercular movement. The level of depth was adjusted by delivering either anaesthetic water or non-anaesthetic water.

2. Surgery

A sterile curved iris scissor was used to debulk excess wen tissues in periocular space down to the level of the dermis to expose the eyes. The prophylactic measure was taken to excise wen tissue cranial to the operculum bilaterally. No haemorrhage was observed. The fluorescein stain was applied to the eyes intraoperatively with no evidence of ocular damage.

3. Recovery

The gills were flushed with non-anaesthetic water several times prior to transferring the fish into a recovery tank (six-litre of non-anaesthetic water). The fish regained the consciousness shortly afterwards and returned the normal gait and swimming ability within 10 minutes. The fish continued to make full recovery after returning to the owner, displaying normal swimming patterns and navigation ability once he was returned to his original tank. No further issue was reported during the three-month postoperative follow-up discussion with the owner.

Discussion

The integumentary growth removal is a commonly performed fish surgical procedure, including wen trim.⁴ The aim of the procedure was the excision of a safe volume of the target tissue to prevent the recurrence of any mass removal. Harms and Wildgoose (2001)⁴ suggested standardising pre-operative diagnostic evaluations to confirm the nature, morphology and stage of any integumentary growth. However, Wen overgrowth was

confirmed in this case based on the history and the visual examination during the initial consultation. It has been reported that a similar clinical presentation may be observed in epithelial neoplasia in goldfish.⁶ However, the origin of the proliferation and its systemic effects, in this case, remain unknown without any diagnostic evidence.

The poor efficacy of low-dose alfaxalone at the induction phase, in this case, failed to demonstrate the desired anaesthetic effect. Bauquier et al (2013)² conducted a study on goldfish to evaluate the efficacy of alfaxalone at different dose rates and reported 5mg/L to 7.5mg/L of alfaxalone in the water (23 - 25°C) to be sufficient to induce sedation within 4 minutes and anaesthetic effect within 28 minutes without any adverse effect. A higher starting dose of alfaxalone would likely fasten the anaesthetic onset which could shorten the procedure time and minimise the anaesthetic-associated risks.

The current understanding and management of wen growth are still in their infancy and surgical excision is the only treatment currently established. It is relatively a safe procedure in a low-anaesthetic risk fish although a number of published veterinary literature relating wen is scarce, giving a limitation to support this claim.

references

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