Severe abdominal distension due to ovarian cysts in a parrot fish 
(Paraneetroplus synspilus)

Rahim Peyghan1*, Ali Ghadiri2, Elham Osroush3, Zahra Tulaby Dezfuly1

1 Department of Aquatic Animal Health, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran; 2 Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran; 3 PhD Candidate, Department of Aquatic Animal Health, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran.

Article Info

Article history:
Received: 21 November 2020
Accepted: 08 May 2021
Available online: 15 December 2021

Keywords:
Abdominal distension
Ovarian cyst
Parrot fish
Radiography

Abstract

In autumn of 2019 a three years old female parrot fish was referred to the veterinary hospital for diagnosis and treatment. The prominent symptom was inappetence and a large mass or unilateral distention in the abdominal cavity. Ultrasonography and radiology imaging with contrast media were done to evaluate the abdominal cavity. According to presumptive diagnosis by imaging, the fluid-filled mass was aspirated by a sterile syringe. No bacteria or other microorganisms were seen in the fluid using microscopy and culturing of the fluid on trypticase soy agar. The parrot fish died after three days because of imbalance and inappetence. Two fluid-filled masses were seen in necropsy. The ovarian structure of the cyst was proved based on the anatomical position, histopathology, ultrasonography and radiology of the cyst tissue. It could be concluded that prompt diagnosis and therapy of ovarian cyst may be necessary for saving the life of the fish.

Introduction

There were many reports about fish diseases in aquarium fishes in Iran and worldwide.1,2 The parrot fish is a hybrid cichlid aquarium fish produced by crossing the Midas cichlid (Amphilophus citrinellus) and the redhead cichlid (Paraneetroplus synspilus).3 Females when do not release the eggs, could absorb mature follicles via atresia at different stages of development. Similar processes of atresia occur in all fish species.4,5

Atresia could occur in the spawning season at any time and may even occur before spawning.6 Nevertheless, in some cases, instead of the usual atretic cycle, an atypical swelling of the follicular envelope occurs, leading to cyst formation. Despite reports of cystic follicles in several animals, there is no report of ovarian cyst in aquarium fishes.

Giant ovarian cysts (GOCs) are rare tumors of the ovary having diameters greater than 10.00 cm in human. It must be determined why certain follicles grow into cysts. Despite reports of cystic follicles in several animals, the origin of this atypical condition is unclear.7,8

There were few detailed works beyond brief references in the literature on fish reproductive ecology and purely descriptive works.8 These cystic follicles if become very large could have significant effects on fish health, since in these cases fish were usually involving irregular body shape, abnormal swimming and abnormal buoyancy conditions.9 The purpose of this study was determining diagnostic testing and research and finding the options for design of appropriate treatment of the fish.

Case Description

A three years old female parrot fish (body weight: 63.00 g) with distention of abdominal cavity was referred to the veterinary hospital for diagnosis and treatment (Fig. 1). The fish was inappetence and lethargic, in lateral recumbence condition. Using radiographic technique by appropriate methods, whole body radiography was performed in two orthogonal views with a digital system (CR Fuji, Hitachi, Santa Clara, USA). Contrast medium (5.00 mL kg⁻¹ bodyweight barium sulphate; Biochem, Cosnes sur luire, France) was given under light anesthesia using
2-phenoxyethanol (Samchun, Gyeonggi-do, Korea) by water bath method and was fed by a stomach tube. Radiographs were taken at varying intervals after barium sulphate feeding. Routine lateral view ultrasonography of the coelomic cavity was performed with a 7.5 MHz linear transducer (UMI, San Jose, USA) with the fish positioned in the right lateral recumbence.

The images showed giant masses in ovary region (Figs. 2 and 3). Two large well-defined fluid-filled cysts and large soft tissue masses were found in caudal portion of the coelomic cavity with anechoic content and thin wall (19.40 × 19.30 mm and 15.00 × 9.00 mm). No other noticeable abnormality was found in the abdominal cavity of the fish.

Fine needle (18G) aspiration of the fluid-filled mass was performed (Fig. 4). The fluid was plasma-like and no bacteria or other microorganisms were seen in the fluid after microscopic examination and culturing of the fluid on trypticase soy agar (Condalab, Madrid, Spain).

The parrot fish died three days after fluid aspiration. The fish might die from osmotic disturbances and edema possibly caused by plasma reaction to abdominal volume change. In necropsy, no septicemia or infection symptoms were seen.

In necropsy, two fluid-filled ovarian follicular masses were found between the normal oocytes (Fig. 5) and the condition was diagnosed as cystic ovary or GOCs. Tissues from the cyst wall were fixed in 10.00% buffered formalin and sent for histological sectioning. The tissue was proved to be from ovarian origin (Fig. 6).
Discussion

Many cysts including cystic ovaries, produce large amounts of ascitic fluid, which between other organs of the body cavity by contrasting, they increase the radiographic information. In this case from the perspective of the swim bladder, the margins of large space-occupying lesions can be seen displacing the swim bladder. Since abdominal tumors are common in fish, the differential diagnosis must be made by biopsy, aspiration or pre-operative strategy.  

Hydrated oocytes of some species of the Perca genus have a thickened vitelline envelope close to those found in oocyte cysts; but, this swelling is part of the fish species, considered as natural oocyte growth and it is not associated with any irregular processes.  

Current data do not allow us to know the exact cause of cyst formation. Mature neoplastic growth may start to secret plasma-like fluid, resulting in a hypertrophic growth and superficial epithelium stratification. After formation of the cysts, they would never be regressed; so, the clinical findings of the cysts would be similar to the effects of tumors. Furthermore, for long periods of time, cysts can persist in the abdomen, impacting health and reproductive capacity of the fish. Generally, cyst resorption period or fate is unclear in fish; but, this cycle appears likely to occur more slowly than normal follicular atresia. Many factors could initiate or modulate cyst formation including physiological and hormonal imbalances of the female, aging of the female, stress, drugs and food additives.  

In the present case, we did not find any abnormal related factor. Duration of cyst formation in this case was unclear; but, according to the history, must be more than six months. This period can influence by environmental factors such as temperature, food availability, stressors and physiological characteristics of the fish. The influence of environmental factors was not evaluated in this research; but, they could affect the rate of cyst incidence either directly, if stressors increase cyst development, or indirectly, by regulating cyst resorption rate and accumulation in ovary. Giant ovarian cysts with diameters greater than 2.00 cm can be regarded as a tumor in fish. It is a rare pathological change in fish and can be diagnosed by proper imaging modalities. The aim of this case report was to show how a huge cystic ovarian mass can mislead the diagnosis of abdominal distention in fish. This report is the first report of giant follicular or cystic ovary in parrot fish.

Acknowledgments

This study was supported by the Veterinary Faculty, Shahid Chamran University of Ahvaz, Ahvaz, Iran (Grant No.: SCU.VC98.413). We thank Pars Lab (Ahvaz, Iran) for histological examination support.

Conflict of interest

The authors have no conflict of interest.

References

1. Domínguez-petit R, Alonso-Fernández A, Saborido-Rey F. Incidence and significance of cystic structures in the ovaries of gadoid fish. Sci Mar 2011; 75(2): 359-368.
2. Barros Paiva R, Neves A, Vieira AR, et al. Cystic structures in fish ovaries: more common than we think. The case study of Sarpa salpa (Sparidae). Cybium 2014; 38(2): 157-160.
3. McMillan DB. Fish Histology: Female Reproductive Systems. 1st ed. Berlin, Germany. Springer. 2007, 137.
4. Ganias K, Somarakis S, Koutsikopoulos C, et al. Ovarian atresia in the Mediterranean sardine, Sardina pilchardus sardina. J Mar Biol Ass UK 2003; 83(6): 1327-1332.
5. Rideout RM, Rose GA. Suppression of reproduction in Atlantic cod Gadus morhua. Mar Ecol Prog Ser 2006; 320: 267-277.
6. Murua H, Saborido-Rey F. Female reproductive strategies of marine fish species of the North Atlantic. J Northwest Atl Fish Sci 2003; 33: 23-31.
7. Tomkiewicz J, Tybjerg L, Jespersen A. Micro- and macroscopic characteristics to stage gonadal maturation of female Baltic cod. J Fish Biol 2003; 62(2): 253-275.
8. Withamme PR, Thorsen A, Kjesbu OS. The fate of vitellogenic follicles in experimentally monitored Atlantic cod Gadus morhua (L.): application to stock assessment. Fish Res 2010; 104: 27-37.
9. Yeika EV, Efe DT, Tolefa C, et al. Giant ovarian cyst masquerading as a massive ascites: a case report. BMC Res Notes 2017; 10, 749. doi:10.1186/s13104-017-3093-8.
10. Novelo ND, Tiersch TR. A review of the use of ultrasonography in fish reproduction, N Am J Aquac 2012; 74(2): 169-181.
11. Blazer VS. Histopathological assessment of gonadal tissue in wild fishes. Fish Physiol Biochem 2002; 26: 85-101.
12. Linares-Casenave J, Van Eenennaam JP, Doroshov SI. Ultrastructural and histological observations on temperature-induced follicular ovarian atresia on the white sturgeon. J Appl Ichthyol 2002; 18(4-6): 382-390.
13. Kjesbu OS, Klungsøyr J, Kryvi H, et al. Fecundity, atresia and egg size of captive Atlantic cod (Gadus morhua) in relation to proximate body composition. Can J Fish Aquat Sci 1991; 48(12): 2333-2343.
14. Engelhard GH, Heino M. Climate change and condition of herring (Clupea harengus) explain long-term trends in extent of skipped reproduction. Oecologia 2006; 146(4): 593-603.