

## Severe abdominal distention due to ovarian cysts in a parrot fish (*Paraneetroplus synspilus*)

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### 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.

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### Introduction

There were many reports about fish diseases in aquarium fishes in Iran and worldwide.<sup>1,2</sup> The parrot fish is a hybrid cichlid aquarium fish produced by crossing the Midas cichlid (*Amphilophus citrinellus*) and the redhead cichlid (*Paraneetroplus synspilus*).<sup>3</sup> 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.<sup>4,5</sup>

Atresia could occur in the spawning season at any time and may even occur before spawning.<sup>6</sup> 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.<sup>7,8</sup>

There were few detailed works beyond brief references in the literature on fish reproductive ecology and purely descriptive works.<sup>8</sup> 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.<sup>9</sup> 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<sup>-1</sup> bodyweight barium sulphate; Biochem, Cosne sur luire, France) was given under light anesthesia using

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2-phenoxyethanol (Samchun, Gyeonggi-do, Korea) by water bath method and was feed 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.<sup>10</sup>

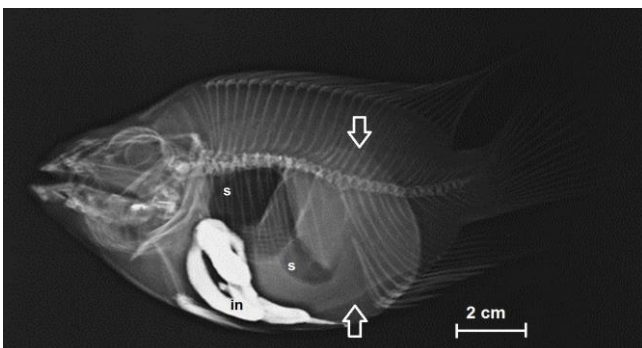


**Fig. 1.** Parrot fish showing a relatively large soft tissue mass in the coelomic cavity (arrows).

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.

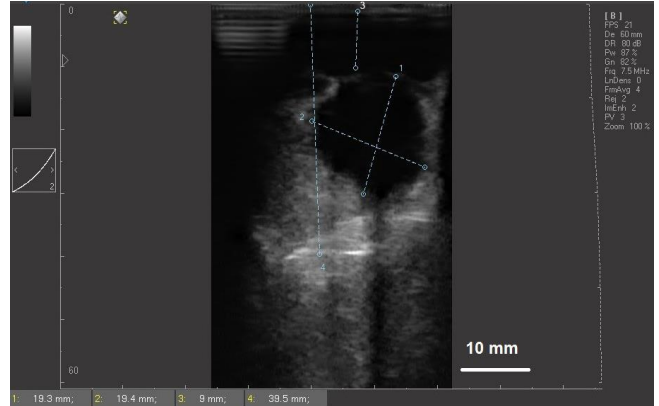
Fine needle (18G) aspiration of the fluid-filled mass was performed (Fig. 4). The fluid was plasma-like and no bacteria or other microorganisms were seen in the fluid after microscopic examination and culturing of the fluid on trypticase soy agar (Condalab, Madrid, Spain).

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.

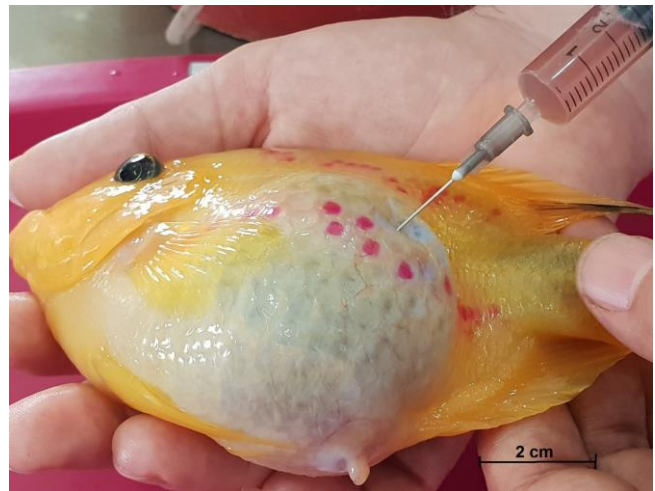


**Fig. 2.** Left lateral radiography of a parrot fish with contrast material (barium sulfate) showing a big fluid-filled mass (arrows). Serosal detailing cannot be distinguished; but, it seems that there is an ill-defined and large soft tissue mass (arrows) in caudal abdomen. The mass displaced caudal portion of swimming bladder ventrally. S: Two chambers of swim bladder; in: Intestine.

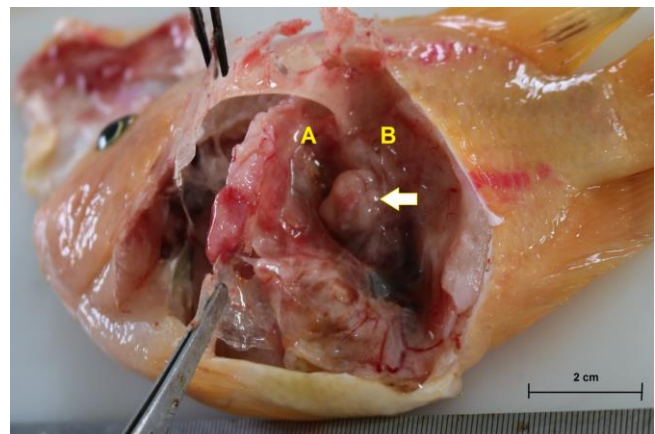
In necropsy, two fluid-filled ovarian follicular masses were found between the normal oocytes (Fig. 5) and the condition was diagnosed as cystic ovary or GOCs. Tissues from the cyst wall were fixed in 10.00% buffered formalin and sent for histological sectioning. The tissue was proved to be from ovarian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



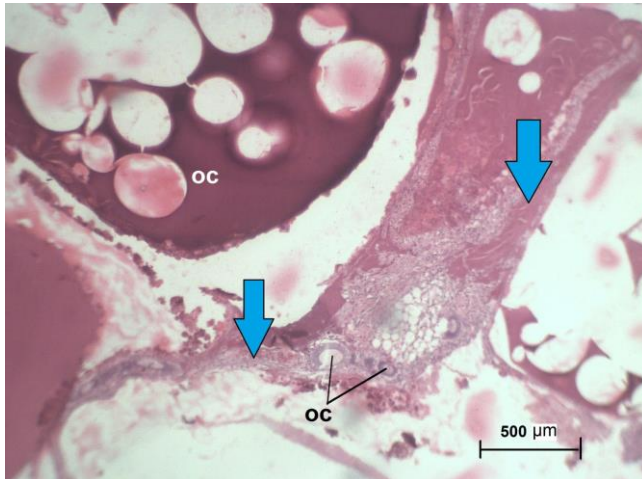
**Fig. 3.** Two ovarian cysts shown by ultrasonography. Diameter of cyst (1 and 2), diameter of second cyst (3) and full layers diameter (4).



**Fig. 4.** Aspiration of fluid from ovarian cyst.



**Fig. 5.** Two ovarian cysts (A and B) shown by necropsy of dead fish. Regressive ovary can be seen in the center (arrow).



**Fig. 6.** The ovarian cyst walls (arrows) and immature oocytes can be seen in the center (OC) (Hematoxylin and Eosin staining).

## 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.<sup>11</sup>

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.<sup>12</sup>

Current data do not allow us to know the exact cause of cyst formation. Mature neoplastic growth may start to secrete 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.<sup>13</sup> 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,<sup>12</sup> aging of the female, stress, drugs and food additives.<sup>5,14</sup>

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.<sup>10</sup> 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.<sup>2</sup> 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.

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## Conflict of interest

The authors have no conflict of interest.

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