

POLYCYSTIC OVARY SYNDROME IN NILE TILAPIA, *Oreochromis niloticus*

SÍNDROME DO OVÁRIO POLICÍSTICO EM TILÁPIA DO NILO, Oreochromis niloticus

**K. S. S. BERTIPAGLIA¹, A. H. SILVA¹, J. W. LOPES¹, A. GROTH¹, A. C. MORAES²,
E. P. FOZ³, M. A. A. BELO⁴, E. J. R. PRADO^{5*}**

SUMMARY

This study presented a case report of a female of *Oreochromis niloticus* in the reproductive age. In the clinical analysis, the animal showed intense abdominal distension, severe cachexia, retraction of the eyeball and lethargic behavior. At the necropsy, it was observed the presence of neoplastic mass in the peritoneal cavity which presented smooth surface, circular appearance, soft consistency and reddish-blackened focal regions. There was the formation of multiple cysts, which presented a yellowish-green liquid content in the cut. In the histopathological examination, multiple dilatations were observed, filled with amorphous eosinophilic material with a delicate fibrocolagenous wall, as well as detachment of the granulosa and theca cells. The presence of macrophage infiltrates with hemosiderin pigments was also observed. The macroscopic and microscopic findings confirm the diagnosis of polycystic ovarian syndrome; however the causes of this cystic disease were not understood.

KEY-WORDS: Cichlids. Ovarian cyst. Fish reproduction. Histopathology.

RESUMO

Este estudo apresentou um relato de caso de uma fêmea de *Oreochromis niloticus* na idade reprodutiva. Na análise clínica, o animal apresentava intensa distensão abdominal, caquexia severa, retração do globo ocular e comportamento letárgico. Na necropsia, observou-se a presença de massa neoplásica na cavidade peritoneal, apresentando superfície lisa, aspecto circular, consistência mole e regiões focais escurecidas de vermelho. Existia a formação de múltiplos cistos, que ao corte apresentavam um conteúdo líquido verde-amarelado. No exame histopatológico, foram observadas dilatações múltiplas, preenchidas com material eosinofílico amorfo com delicada parede fibrocolagenosa, além de descolamento das células da granulosa e da teca. A presença de infiltrados de macrófagos com pigmentos de hemossiderina também foi observada. Os achados macroscópicos e microscópicos confirmam o diagnóstico de síndrome do ovário policístico; no entanto, as causas desta doença cística não foram compreendidas.

PALAVRAS-CHAVE: Ciclídeos. Cisto ovariano. *Oreochromis niloticus*. Reprodução em peixe.

¹ Discente Universidade Federal de Mato Grosso (UFMT), Campus Sinop. MT, Brasil.

² Docente Fundação Universidade Federal de Rondônia (UNIR), Campus Rolim de Moura, RO, Brasil.

³ Médica Veterinária autônoma., Porto Ferreira, SP, Brasil.

⁴ Docente Universidade Brasil, Campus Descalvado – SP, Brasil.

⁵ Docente Universidade Federal de Mato Grosso (UFMT), Campus Sinop. MT, Brasil. edjohnny10@gmail.com

INTRODUCTION

Fish farming is in increasing expansion in Brazil, requiring the use of technologies of reproduction and intensive management to rear a larger number of specimens in less time and with restrict space. However, the increase of species by area, added to the management practices, results in the occurrence of stress that can lead to a higher incidence of reproductive disorders, besides the development of opportunistic infectious diseases (SAKABE et al., 2013; BELO et al., 2014).

Reproductive disorders are characterized by several factors, which may include infectious, metabolic, endocrine, neoplastic, inflammatory causes, as well as the negative influence of chemical substances that deregulate the endocrine system favoring the appearance of several reproductive changes in females of teleosteal fish (ARUKWE, 2001).

According to Escobar-Morreale (2018), polycystic ovary syndrome (PCOS) is a common disorder in women, and the aetiology of this disorder remains largely unknown. In bitches, the common ovarian diseases appear to be cystic ovaries and ovarian tumors', affecting health, fertility or even the life of the animal (ARLT & HAIMERL, 2016). Cystic ovary in dairy cattle is also reported as some of the major cause of impact on reproductive efficiency of bovines (VANHOLDER et al., 2006).

Disorders and neoplasms related to the reproductive system in fish are poorly reported (GROFF, 2004; ROBERTS, 2012). There is a lack of evidence for the presence of adenocarcinomas, leiomyomas and some neoplasms of mesenchymal origin (STOSKOPF, 1993). On the other hand, YAN et al. (2017) demonstrated that

zebrafish, *Danio rerio*, can be an important model to study polycystic ovary syndrome for improvements in human medicine.

Based on the impact of ovarian diseases on animal reproduction and the scarce literature on the occurrence of ovarian cysts in fish, this research presents a case report of Nile tilapia female in the reproductive age, highlighting findings of clinical and histopathological changes.

CASE REPORT

The animal to be reported is Nile tilapia (*Oreochromis niloticus*) female in reproductive age, "GIFT" lineage, weighing 914g from commercial fish farm for fingerlings production, located in Porto Ferreira, São Paulo State, Brazil (Latitude: 21° 51' 14" S; Longitude: 47° 28' 45" W). The owner resorted to veterinary medical care because some specimens from previous breeding matrices had the same historical: bulging of the abdomen, cachexia and subsequent death.

In the clinical analysis, the animal showed intense abdominal distension, severe cachexia, retraction of the eyeball and lethargic behavior (Figure 1). In view of the fish clinical situation, the veterinarian requested permission from the owner to perform euthanasia. At the necropsy, it was observed the presence of neoplastic mass in the peritoneal cavity (Figure 2) which presented smooth surface, circular appearance, soft consistency and reddish-blackened focal regions, measuring approximately 10 x 6.5 cm. There was the formation of multiple cysts, which presented a yellowish-green liquid content in the cut.



Figure 1- Tilapia female showing intense abdominal distension, severe cachexia and retraction of the eyeball.



Figure 2 - Opening of the peritoneal cavity, abdominal region, showing neoplastic formation, with reddish-blackened focal regions.

In view of the macroscopic characteristics, it was chosen to fix fragments of the neoplasia in liquid solution containing 4% formaldehyde prepared in phosphate buffer, at a molar concentration of 0.1 M and pH 7.2. Hence, the histological slides were prepared and stained with hematoxylin and eosin (HE).

In the histopathological examination, multiple dilatations were observed, filled with amorphous

eosinophilic material with a delicate fibrocolagenous wall, as well as detachment of the granulosa and theca cells (Figure 3). The presence of macrophage infiltrates with hemosiderin pigments was also observed. The macroscopic and microscopic findings confirm the diagnosis of polycystic ovarian syndrome.

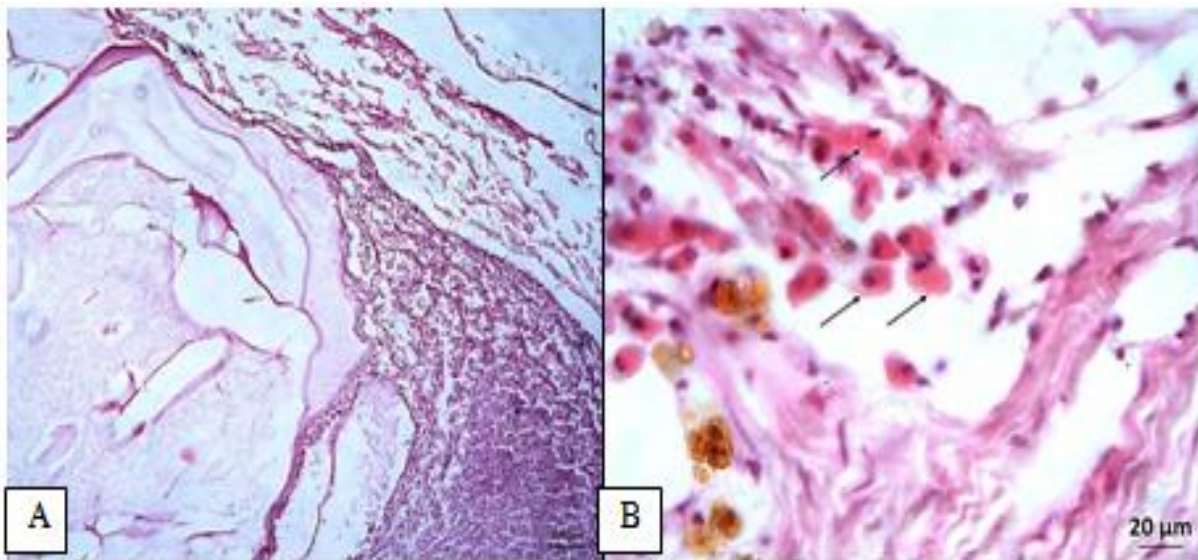


Figure 3 - A) Cyst filled with amorphous eosinophilic material with a delicate fibrocolagenous wall, and detachment of granulosa and theca cells. B) Areas with inflammatory infiltrate being composed mostly by macrophages (arrows), with hemosiderin pigments (brownish staining). Staining in hematoxylin and eosin.

DISCUSSION

Polycystic ovary syndrome can be associated with several factors such as reproductive, genetic, endocrine and metabolic (WALTERS et al, 2018), and may be related to environmental stress (TOUFEXIS et

al., 2014). As an example in cattle, polycystic ovary syndrome is associated with selection for high milk production (ROSENBERG, 2010).

Silveira et al. (2016) reported the case of ovarian cyst in *Astyanax paranae*, differing by this report as being of epidermoid origin, the authors

suggested the development from a cystic dilation and subsequent metaplasia. As the same our report, Abowei et al. (2011) observed anorexia with metaplasia in *Clarias gariepinus* female from Lake Victoria and the necropsy revealed the ovary comprised of several large (up to 4 cm diameter) cysts full of serous liquid.

Tumors, cysts, and other growths on the surface of the ovary were found in the *Siberian sturgeon*, and in accordance with Ruban (2018) developmental and functional abnormalities of the reproductive system of fishes as an Indicator of anthropogenic impacts. An experimental study related the development of ovarian cysts with the exposure to the herbicide atrazine (TILLITT et al., 2010). Thus, there are reports of polycystic ovarian syndrome in fish by toxicological induction or exposed to androgens treatment. Kortner (2008) discussed the role of androgens on previtellogenic oocyte growth in Atlantic cod (*Gadus morhua*).

FINAL CONSIDERATIONS

The origin of the polycystic ovary syndrome can not be stated, since in all species the causes are multifactorial, which makes it difficult to understand the main cause. More detailed studies on fish farming should be carried out, since many clinical cases are neglected, and this disease may represent important losses in fish farms for fingerlings production.

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