

## Thecoma in an Elderly Crioulo Mare

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### ABSTRACT

**Background:** Ovarian enlargement in mares can either be a physiological or pathological condition associated with neoplastic or non-neoplastic causes. Neoplasia is more prominent in elderly than young horses. Granulosa cell tumors are the most common neoplastic cause of ovarian enlargement, and thecoma is the rarest. Thecoma is a benign ovarian stromal neoplasia originating from the sexual cords of the embryonic gonad and can affect the production of steroid hormones, leading to changes in behavior and the estrous cycle. If only one ovary is affected, after unilateral ovariectomy, usually the mare can still be used for reproductive purposes. Herein, we report a case of ovarian thecoma in an elderly Crioulo mare.

**Case:** A 15-year-old Crioulo mare was evaluated due to progressive weight loss. The mare presented a low body score, and on physical examination, all parameters were within reference limits. Hematological examination revealed anemia, hyperfibrinogenemia, and neutrophilia. Serum biochemistry examination were within the physiological limits. Rectal palpation revealed an increase in volume in the left ovary (4.3 × 2.9 × 3 cm), smooth consistency and no associated pain in either of the ovaries. Rectal ultrasonography revealed a heterogeneous pattern, suggesting a neoplasm. As a treatment modality and for definitive diagnosis, the mare underwent a unilateral flank ovariectomy laparoscopically in the quadrupedal position. On histopathological evaluation of the left ovary, the sample showed cysts associated with proliferating spindle cells arranged in a solid arrangement, occasionally forming eddies, in addition to hemosiderosis, with clear cytoplasm and lipid vacuoles. Macroscopically, the ovary presented with a regular surface, smooth to firm consistency, a homogeneous brownish appearance with blackened foci, and brownish fluid-filled cysts. These findings confirmed thecoma of the left ovary in the mare.

**Discussion:** Ovarian enlargement in mares can be associated to the presence of neoplasia. Clinical signs of ovarian neoplasms can be nonspecific; therefore, to achieve a definitive diagnosis, it is imperative to evaluate and compare the patient's history, physical examination, and results of complementary examinations. Excessive production of hormones lead to behavioral changes in mares with ovarian tumors, such as masculinized or aggressive behavior, and anestrus persistence. Thecomas may or may not interfere with steroid production and levels. On ultrasound examination, ovarian neoplasms may present similar echogenicity patterns. Histopathological evaluation is the best diagnostic approach after an ovariectomy. The prognosis of ovariectomy is considerably successful with the mare regaining reproductive health, although some mares may become infertile, with a small, inactive contralateral ovary. Thecoma is a rare neoplasm in horses; however, owing to its potential to cause altered reproductive functions, it should be considered as a differential diagnosis in mares with increased ovarian volume.

**Keywords:** theca cell, histopatology, neoplasia, ovary.

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## INTRODUCTION

The etiological causes of ovarian enlargement in mares include both neoplastic and non-neoplastic factors [11]. Ovarian hematoma, abscess, and torsion are considered as non-neoplastic causes [16]. Among the neoplastic causes, granulosa cell tumor is the most common, while thecoma is the rarest [14].

Thecoma is a benign ovarian stromal neoplasm originating from the sexual cords of the embryonic gonad and is made up of granulosa and theca cells. As it is difficult to differentiate between thecoma and fibroma, “fibrothecoma” can be used to describe neoplasms with altered theca cells and fibroma characteristics [3]. In humans, fibrothecoma is uncommon, with 3-4% of all ovarian tumors being unilateral in 90% of the cases. Fibrothecoma usually affects women over 30 years of age; after menopause, it is characterized by pain in the pelvic region and metrorrhagia [4,15,18].

In unilateral thecoma, if the contralateral ovary remains unaffected, the mare can still be used for reproductive purposes following a unilateral ovariectomy [2,8]. In the present study, we report a case of ovarian thecoma in an elderly Crioulo mare.

## CASE

A 15-year-old Crioulo breed mare, weighing 300 kg, was evaluated due to progressive weight loss. The female was kept only as a pet, and was the only horse on the farm.

Based on visual inspection of the mare, a low body conditioning score of 1 (0-5 scale) was observed (Figure 1). Physical examination revealed a heart rate of 48 beats per min, respiratory rate of 20 breaths per min, pale mucosa, capillary perfusion time of 2 s, and body temperature of 37.4°C. Rectal palpation detected



**Figure 1.** A 15-year-old Crioulo mare with low body conditioning score and ovarian thecoma.

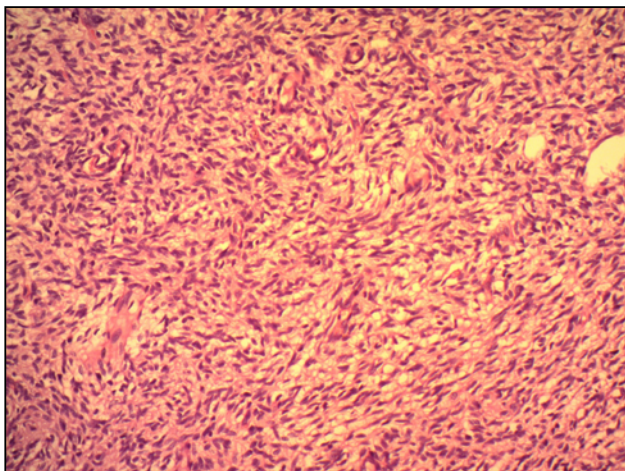
an increase in volume in the left ovary with a smooth consistency and no pain in the affected ovary. Rectal ultrasonography revealed a heterogeneous pattern.

Hematological examination was performed, which revealed anemia ( $5 \times 10^6/\mu\text{L}$  erythrocytes; hemoglobin 8.2 g/dL; and hematocrit 23%); hyperfibrinogenemia (8 g/dL fibrinogen); total leukocyte count  $13.500/\mu\text{L}$  with neutrophilia (segmented 11.610, 86%), lymphopenia (1.485, 11%), and monocytes (405, 3%). Platelet count ( $276 \times 10^3/\mu\text{L}$ ) and total plasma protein (8 g/dL) levels were within the reference standards. Results of the serum biochemistry examination were within physiological limits (AST 287.9 U/L; CPK 310.2 U/L; FA 277.3 U/L; creatinine 1.07 mg/dL; and urea 37.9 mg/dL).

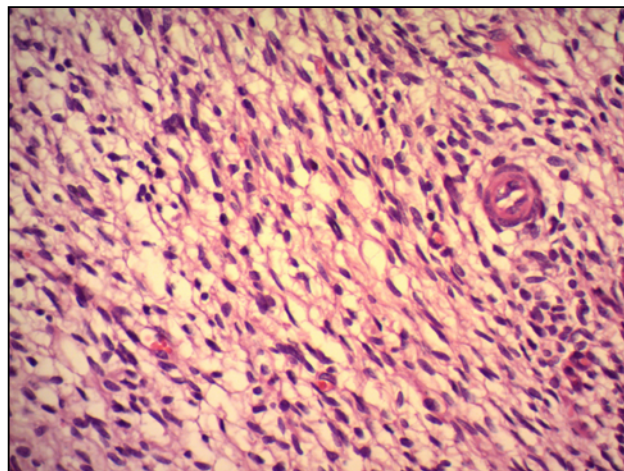
Exploratory laparoscopy was performed according to the technique described by Auer & Stick [1], with the mare in a quadrupedal position under neuroleptoanalgesia and local anesthesia. The spleen had an atrophied and blackened appearance with an irregular pattern and whitish nodules. Similar changes in appearance were observed in the parietal wall of the adjacent costal arch region and in the liver. The left ovary appeared black in color, and its size was increased as compared to the right ovary. Neoplasia was suspected, and unilateral flank ovariectomy was performed, wherein the left ovary was excised for histopathological examination.

In the postoperative period, supportive therapy used was based on meloxicam<sup>1</sup> [Maxitec<sup>®</sup> - 0.6 mg/kg, IV, SID, for 5 days]; sodium dipyrone<sup>2</sup> [D500<sup>®</sup> - 50 mg/kg, IV, BID, for 3 days]; benzathine penicillin<sup>3</sup> [Bepeben<sup>®</sup> - 22.000 IU/kg, IM, every 48 h with three administrations]; and gentamicin<sup>1</sup> [Gentomicin<sup>®</sup> - 7.2 mg/kg, IM, SID for 5 days]. Surgical wound was cleaned daily.

Macroscopically, the ovary measured  $4.3 \times 2.9 \times 3$  cm, had a regular surface, and a smooth to firm consistency. The excised sample revealed a homogeneous and brownish appearance, with blackened foci and brownish fluid-filled cysts. Microscopically, the sample showed the presence of cysts associated with the proliferation of spindle cells arranged in a solid arrangement, forming occasional eddies with hemosiderosis, clear cytoplasm, and lipid vacuoles. Based on the clinical examination findings and histopathological results, the mare was diagnosed with thecoma in the left ovary (Figures 2 & 3).



**Figure 2.** Photomicrograph of a thecoma in a mare, with intense fusiform cells in solid arrays and forming eddies [HE; 10x].



**Figure 3.** Photomicrograph of a thecoma in a mare, showing fusiform cells with clear and vacuolated cytoplasm [HE; 40x].

## DISCUSSION

Ovarian enlargement in mares may be considered physiological or an indication of a pathological condition [10], and thus requires clinical evaluation.

Among the non-neoplastic causes, ovarian hematoma is the most common, while among neoplastic causes, granulosa cell tumor is the most frequent [7]. Clinical signs of ovarian neoplasms can be nonspecific; therefore, a comparative analysis of the patient's history, physical examination, and results of complementary examinations must be carried out in order to achieve a definitive diagnosis.

Ovarian neoplasms may present similar patterns of echogenicity on ultrasound examination [17], complicating the differential diagnoses. Thus, more specific tests are required, such as tomography, histopathology, immunohistochemistry, and hormonal level testing [14]. In the present report, due to cost constraints, we chose to perform only histopathological evaluation after unilateral ovariectomy.

Behavioral changes in mares with ovarian tumors are associated with the excessive production of hormones by the affected ovaries. The increase in testosterone secretion can induce masculinized and aggressive behavior as well as anestrus persistence [7]. Although thecomas can interfere with hormone production, especially steroids, some authors have reported hormone levels within physiological limits [13,14].

In Brazil, evaluating hormonal levels can be expensive with time-consuming tests, which may be difficult to avail in all laboratories (region-specific), making it burdensome to perform. In the present study, no behavioral or reproductive changes were observed;

however, it is noteworthy that the mare was already aged, had a calm temperament, had no contact with other horses, and was not used for reproduction. Therefore, altered reproductive functions could be difficult to be noticed. Moreover, the female showed no masculine physical changes such as increased clitoris, thickening of the neck, or longer hair in the head region.

In a previous case of a mare with thecoma, the female presented with masculinization, disinterest in males, anestrus, and when performing laboratory tests, an increase in testosterone concentration was found, while progesterone was within the limits [12]. In another report, the authors found a large mass (24 × 22 × 16 cm) in the anterior part of the mare's pelvic cavity [14]. Hormones like testosterone levels were low (>10 pg/mL), and progesterone levels indicated active luteal tissue (3.1 ng/mL). After laboratory and ultrasound evaluations, the patient underwent laparotomy, where a mass adhering to the cecum was detected. After euthanasia and necropsy, histopathological examination confirmed the presence of thecoma. The mare was young and had not yet been used for breeding; hence, there was no opportunity to detect reproductive behavioral changes [14].

All sex cord neoplasms have the potential to be hormonally active. Additionally, the chances of metastasis vary according to the species and type of tumor. Granulosa cell tumors are generally benign in mares, whereas metastasis is relatively common in bitches and queens [7]. In cattle, reports of metastasis in animals with sexual cord stromal tumors vary according to the literature [19]. Fibrothecomomas with malignant characteristics are rare [9]. However,

metastases can occur in regional lymph nodes via the blood to a variety of organs or, more rarely, via implantation in the peritoneal cavity [7]. Although the mare in the present case was an elderly patient, no metastatic signs were detected.

In humans, the prognosis of women affected with unilateral fibrothecoma is considerably good, and after removal of the neoplasm, the symptoms usually disappear [4]. In mares, information about reproductive life post thecoma removal is lacking; however, the literature suggests that the prognosis is favorable, with the mare returning to reproduction a few months after unilateral ovariectomy [2,8,12]. However, even after removal of the affected ovary, some mares may

remain infertile with a small, inactive contralateral ovary [5,6,13].

Thecoma is a rare neoplasm in horses; however, owing to its potential to cause altered reproductive functions, it should be considered as a differential diagnosis in mares with increased ovarian volume, especially in the adults and the elderly.

#### MANUFACTURERS

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