Arq. Bras. Med. Vet. Zootec., **v.77, n.4, e13322, 2025**

http://dx.doi.org/10.1590/1678-4162-13322

Case Report - Veterinary Medicine

Primary ovarian leiomyosarcoma in a dog – case report

[*Leiomiossarcoma ovariano primário em cadela – relato de caso*]

F.S. *Flores*, C.C. *Rosa*, A.V. *Hörbe*, C.K.N. *Calva*, G.R. *Cassanego*, G.D. *Kommers*, L.F.D. *Corrêa*

Universidade Federal de Santa Maria, Santa Maria, RS, Brasil

ABSTRACT

Leiomyosarcoma is the most common malignant mesenchymal tumor found in the retroperitoneal and intra-abdominal regions, while its ovarian location is considered rare in bitches and is scarce in the literature due to its underdiagnosis. A 12-year female dog of no defined breed was seen presenting with an increase in volume in the right flank region and tenderness on palpation caudal to the last right rib. Considering the suspicion of an abdominal neoplasm, the patient underwent ultrasound, which detected the presence of a heterogeneous mass in the right ovary. For diagnostic purposes, an exploratory celiotomy was performed, in which the 18x15x8cm mass was excised and sent for histopathological analysis. Multiple cysts were detected in the left ovary and pyometra in both uterine horns. Histopathological examination showed non-encapsulated neoplastic proliferation, composed of mesenchymal cells, neoplastic cells with indistinct cytoplasmic boundaries, eosinophilic fibrillar cytoplasm, oval or fusiform nuclei, finely granular chromatin and a single conspicuous nucleolus, making the diagnosis highly compatible with leiomyosarcoma in the right ovary. To confirm the histogenesis, the IHC technique was used. As a result, complementary tests become essential tools for better diagnosis and correct therapy in these disorders, as they present specific clinical signs.

Keywords: ovariohysterectomy, ovarian neoplasm, pyometra

RESUMO

O leiomiossarcoma é o tumor mesenquimal maligno mais comumente encontrado nas regiões retroperitoneal e intra-abdominal; já a sua localização ovariana é considerada rara em cadelas e é de ocorrência escassa na literatura devido ao seu subdiagnóstico. Foi atendida uma cadela, sem raça definida, de 12 anos, apresentando aumento de volume na região de flanco direito e sensibilidade à palpação caudal à última costela direita. Considerando a suspeita de neoplasia abdominal, o paciente foi submetido à ultrassonografia, que detectou a presença de uma massa heterogênea em topografia de ovário direito. Com finalidade diagnóstica, foi realizada celiotomia exploratória, em que se excisou a massa de 18x15x8cm de dimensão, enviada para análise histopatológica. Foram detectados múltiplos cistos no ovário esquerdo e piometra em ambos os cornos uterinos. O exame histopatológico apresentou proliferação neoplásica não encapsulada, composta por células mesenquimais, células neoplásicas com limites citoplasmáticos indistintos, citoplasma fibrilar eosinofílico, núcleos ovais ou fusiformes, cromatina finamente granular e um único nucléolo conspícuo, sendo o diagnóstico altamente compatível com leiomiossarcoma em ovário direito. Para a confirmação da histogênese, a técnica de IHQ foi realizada. Dessa forma, por apresentar sinais clínicos específicos, exames complementares tornam-se ferramentas essenciais para melhor diagnóstico e terapêutica correta nessas afecções.

Palavras-chave: ovário-histerectomia, neoplasia ovariana, piometra

Corresponding author: fabiano.flores@acad.ufsm.br
Submitted: June 6, 2024. Accepted: October 2, 2024.

INTRODUCTION

The main ovarian pathologies in bitches include ovarian hypoplasia, follicular cysts, oophoritis, adenoma and granulosa cell tumor. In addition, these pathologies can occur subclinically in healthy animals, suggesting that early castration may be useful as a preventative measure (Maya-Pulgarin *et al*., 2017). Ovarian neoplasms occur infrequently in female dogs and are often underdiagnosed or associated with other reproductive pathologies, such as pyometra, masking the diagnosis (Oviedo-Penatã *et al*., 2020).

Leiomyosarcoma is a malignant tumor of mesenchymal origin that presents cells originating from smooth muscle, with a typical histopathological pattern of fascicles of crossed and delimited spindle cells with a large amount of eosinophilic cytoplasm and elongated and hyperchromatic nuclei (Serrano and George, 2013). In humans, ovarian leiomyosarcoma is a rare pathology (Mandato *et al*., 2023), but it is one of the most frequent soft tissue sarcomas, accounting for between 10% and 20% of the most diagnosed (Serrano and George, 2013). However, no reports were found in the literature on its primary ovarian location in dogs.

The clinical signs observed in patients with leiomyosarcoma are non-specific and are related to the displacement of adjacent structures or tumor invasion, as well as often being associated with concomitant pathologies (Oviedo-Penatã *et al*., 2020; Serrano and George, 2013). To date, there are no reports in the veterinary literature of a diagnosed case of this tumor in canines.

Therefore, this report aims to describe a case of primary ovarian leiomyosarcoma in a female dog, emphasizing its clinical aspects and diagnosis, to contribute to the routine of veterinary medicine.

CASUISTRY

A 12-year-old female canine of no defined breed was seen at the University Veterinary Hospital in Santa Maria, presenting with a history of progressive weight loss and loss of appetite for four days, as well as an increase in volume on the right flank of the abdomen. Physical examination revealed an increase in volume and tenderness on palpation of the caudal region of the last right rib. In the suspicion of an abdominal neoplasm, complementary imaging tests such as ultrasound were requested, as well as hematological tests such as blood count and biochemistry.

Ultrasound showed a large heterogeneous mass, interspersed with cystic structures, in the right ovary (Fig. 1A), as well as dilation of the uterine horns due to moderately cellular anechoic content, alterations suggestive of pyometra or hemometra. Hematological and biochemical tests revealed no alterations, except for the presence of leukocytosis (14,900 uL - reference: 5,700 to 14,200 uL) and neutrophilia (11,920 uL - reference: 2,700 to 9,400 uL). For diagnostic and therapeutic purposes, exploratory celiotomy was performed. The removed material was fixed in 10% neutral formaldehyde and sent for histopathological and immunohistochemical (IHC) analysis.

Macroscopic findings showed a mass in the right ovary, measuring 18.0 x 15.0x 8.0 cm, of soft consistency, with firm areas and others floating; on sectioning, it was multilobulated, with solid white and reddish areas, and cystic (necrotic) areas containing translucent liquid (Fig. 1B). Histopathological examination showed a non-encapsulated, densely cellular neoplastic proliferation composed of mesenchymal cells. It was made up of wide, densely interwoven fascicles of spindle cells. The neoplastic cells had indistinct cytoplasmic boundaries, eosinophilic fibrillar cytoplasm, with oval or spindle-shaped nuclei (sometimes with blunt ends), finely granular chromatin and a single conspicuous nucleolus. There was marked anisocytosis and anisokaryosis and frequent karyomegaly. Three figures of mitoses were observed in 10 high magnification fields (CGA; 400x) (Fig. 1C). There were multiple areas of intratumoral necrosis. The diagnosis was highly compatible with leiomyosarcoma. To confirm the histogenesis, the IHQ technique was performed, and the neoplastic cells were strongly positive for smooth muscle alpha-actin (intracytoplasmic labeling), confirming the diagnosis of leiomyosarcoma (Fig. 1D). There were also multiple cysts in the left ovary and pyometra in both uterine horns.

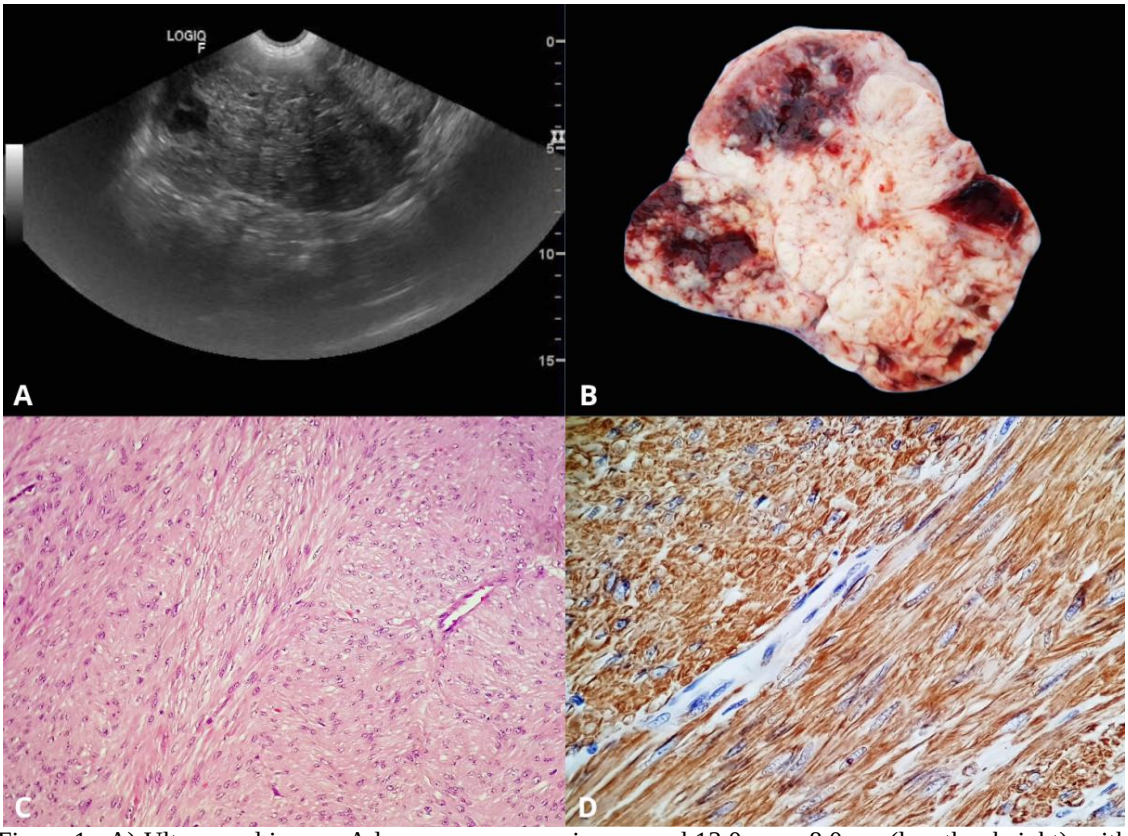

Figure 1. A) Ultrasound image. A large mass measuring around 13.0 cm x 8.0 cm (length x height), with a heterogeneous, hypoechogenic appearance and interspersed with cystic structures, can be seen in the right ovary. B) Mass in the right ovary, cut surface. It is multilobulated, with solid white areas and cystic (necrotic) areas containing translucent red liquid. C) Leiomyosarcoma, right ovary, dog. Mass composed of wide, densely interwoven fascicles of spindle-shaped cells in multiple directions. HE. D). Note the strong cytoplasmic immunostaining of the spindle cells for smooth muscle alpha-actin. IHQ (HRP polymer).

DISCUSSION

Ovarian neoplasms are rare in female dogs, accounting for 0.5% to 1.2% of canine tumors (Saba and Lawrence, 2013). This scenario is often associated with the practice of castration at an early age, which can often mask its occurrence (Kazmierczak *et al*., 2023; Saba and Lawrence, 2013). Among the types of ovarian neoplasms, those of epithelial origin stand out, which are the most common, as well as stromal tumors of the sex cord, germ cells, and mesenchymal origin, such as leiomyomas, hemangiomas and fibromas (Agnew and Maclachlan, 2016). However, the presence of malignant mesenchymal tumors in female dogs is considered rare and, to the authors' knowledge, no records were found in the literature on the incidence of ovarian leiomyosarcoma. Cases involving leiomyosarcoma in the female reproductive tract of dogs have involved the uterus (Serin *et al*., 2010; Tsioli *et al*., 2011), and more recently, the uterus and fallopian tubes (Kazmierczak *et al*., 2023).

Pyometra is often observed in situations related to ovarian neoplasms (Hong *et al*., 2022), as seen in this case, and has already been correlated with a case of uterine leiomyosarcoma (Tsioli *et al*., 2011). It should be considered that the presence of a malignant neoplasm, such as leiomyosarcoma, can compromise the animal's immune response, resulting in a localized loss of defense mechanisms in the affected organ, and this, in turn, contributes to the development of uterine infections, such as pyometra (Tsioli *et al*., 2011).

Ultrasound not only plays an essential role in detecting ovarian pathologies but is also an

indispensable diagnostic tool for establishing suspicion (Troisi *et al*., 2023). The diagnosis of ovarian tumors using computed tomography highlights some of the limitations of the ultrasound technique, especially regarding large tumor masses and the presence of subsequent metastases (Hong *et al*., 2022). In this context, computed tomography has proved to be a diagnostic method that enables the precise location of the tumor and, additionally, contributes to the identification of distant metastases (Hong *et al*., 2022). Despite this, in the case presented, ultrasound proved to be adequate to raise diagnostic suspicion.

The histopathological diagnosis in this case was based on cell morphology plus the frequent presence of areas of intratumoral necrosis and a mitotic count above 1/10 CGA (400x), which are among the main malignancy criteria for differentiating leiomyomas and leiomyosarcomas. In IHQ, smooth muscle alpha-actin, used in this case, is a specific marker for smooth muscle differentiation and can distinguish smooth muscle tumors from skeletal or cardiac muscle tumors, as well as from other spindle cell neoplasms, such as fibrosarcoma (Cooper and Valentine, 2017). IHQ is indicated as a confirmatory test for pathology.

CONCLUSIONS

It can be concluded that leiomyosarcoma is a malignant tumor of mesenchymal origin, with its primary origin in the ovary, and there have been no reports in the veterinary literature to date. Therefore, specific clinical signs, together with complementary tests, are essential tools for the correct diagnosis and treatment of reproductive diseases, as in the case reported here.

REFERENCES

AGNEW, D.W.; MACLACHLAN, N.J. Tumors of the genital systems. In: MEUTEN, D.J. *Tumors in domestic animals*. New York: John Wiley and Sons, 2016. chap.16, p.689-722.

COOPER, B.J.; VALENTINE, B.A. Tumors of muscle. In: MEUTEN, D.J. *Tumors in domestic animals*. New York: John Wiley& Sons, 2017. chap.11, p.425-466.

HONG, S.B.; CHOI, H.J.; LEE, Y.W. Computed tomographic features of canine ovarian masses. *J. Vet. Clin*., v.39, p.107-113, 2022.

KAZMIERCZAK, J.; SUGAI, N.J.; WITHOWSKI, K.E. *et al*. Case report: a case of oviductal and uterine leiomyosarcoma in an 11-year-old dog. *Front. Vet. Sci.*, v.10, p.1227799, 2023.

MANDATO, V.D.; TORRICELLI, F.; MASTROFILIPPO, V. *et al.* Primary ovarian leiomyosarcoma is a very rare entity: a narrative review of the literature. *Cancers*, v.15, p.2953, 2023.

MAYA-PULGARIN, D.; GONZALEZ-DOMINGUEZ, M.S.; ARANZAZU-TABORDA, D. *et al*. Histopathologic findings in uteri and ovaries collected from clinically healthy dogs at elective ovariohysterectomy: a cross-sectional study. *J. Vet. Sci.*, v.18, p.407-414, 2017.

OVIEDO-PENATÃ, C.A.; HINCAPIE, L.; RIAÑO-BENAVIDES, C.; MALDONADO-ESTRADA, J.G. Concomitant presence of ovarian tumors (teratoma and granulosa cell tumor) and Pyometra in an English bulldog female dog: a case report. *Front. Vet. Sci.*, v.14, p.500, 2020.

SABA, C.F.; LAWRENCE, J.A. Tumors of the female reproductive system. In: VAIL, D.M.; THAMM, DH.; LIPTAK, J.M. *et al*. *Withrow and MacEwen's small animal clinical oncology.* Philadelphia: Elsevier, 2013. chap.26, p.532-537.

SERIN, G.; AYDOGAN, A.; YAYGLINGUL, R.; TUNCA R. Uterine leiomyosarcoma in a dog: a case report. *Vet. Med.*, v.55, p.405-408, 2010.

SERRANO, C.; GEORGE, S. Leiomyosarcoma. *Hemat. Oncol. Clin. North Am.*, vol.27, p.957-974, 2013.

TROISI, A.; ORLANDI, R.; VALLESI, E. *et al*. Clinical and ultrasonographic findings of ovarian tumours in bitches: a retrospective study. *Theriogenology*, v.210, p.227-233, 2023.

TSIOLI, V.G.; GOULETSOU, P.G.; LOUKOPOULOS, P. *et al*. Uterine leiomyosarcoma and pyometra in a dog. *J. Small Anim. Pract.*, v.52, p.121-124, 2011.