



## Extragenadal malignant teratoma in a dog - case report

[*Teratoma extragenodal maligno em cão - relato de caso*]

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### ABSTRACT

Teratomas are neoplasms thought to arise from germ cells which usually occur within gonads and are rarely described on extragenadal sites. The present study reports a case of a 15 year old female mongrel dog with a lumbosacral tumor. The tumor was microscopically composed of embryonic tissues with areas containing atypical undifferentiated cells, leading to the diagnosis of a malignant teratoma. Malignant teratomas are uncommon tumors in domestic animals.

Keywords: canine, neoplasia, germ cell, teratoma, extragenadal tumors

### RESUMO

Os teratomas são neoplasias originárias das células germinativas que têm como sítio principal as gônadas; raramente ocorrem em sítios extragenodais. O presente estudo relata um caso de uma cadela de 15 anos de idade, sem raça definida, apresentando aumento de volume na região lombossacral que ao exame microscópico revelou neoformação composta por tecidos de origem embrionária, com áreas indiferenciadas exibindo atipia celular, características compatíveis com teratoma maligno. Teratomas malignos são incomuns em animais domésticos.

Palavras-chave: canino, neoplasia, célula germinativa, teratoma, tumor extragenodal

### INTRODUCTION

Teratomas are neoplasms thought to arise from germ cells derived from two or more cell lines (ectoderm, mesoderm, endoderm) (Cullen *et al.*, 2002). The terms “teratocarcinoma” and “malignant teratoma” have been used to refer to teratomas containing mixtures of different malignant germ cell components according to Henry *et al.*, 1975. Commonly, gonads are one of the most affected anatomical sites by these neoplasms in both humans and animals. Nevertheless, these tumors may also develop in extragenadal sites. In these cases, they usually occur along the median sagittal plane of the body (Cullen *et al.*, 2002; Ma *et al.*, 2011), being reported in different locations. Rare cases of such neoplasms have been documented affecting the cervical vertebral column/ spine region (Wong *et al.*, 2007). Thus, the purpose of this study is to

describe a rare case of malignant teratoma in the lumbar spine of a dog.

### CASUISTIC

A 15-year-old female dog of undefined breed, presenting a volume increase in the lumbosacral region was submitted to surgical excision and the specimen was sent to the Laboratory of Comparative Pathology at the Institute of Biological Sciences of the Federal University of Minas Gerais. Histopathological evaluation and immunohistochemistry were performed to confirm the histological types observed. The material was fixed in 10% neutral buffered formalin and embedded in paraffin wax. 4- $\mu$ m-thick histological sections were cut and stained with hematoxylin and eosin.

Consecutive 4- $\mu$ m-thick sections of primary tumors were mounted on common slides, stained with primary antibody and viewed using

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peroxidase-based polymer detection systems (Novolink, Leica Microsystems). Endogenous peroxidase activity was blocked with 3% hydrogen peroxide solution in methyl alcohol. Reagents were applied manually, and immunoreactivity was visualized by incubating the slides with diaminobenzidine (Lab Vision

DAB substrate system) for 5 minutes. The details regarding the antibodies, dilutions, antigen retrieval procedures, and incubation times used in the immunostaining process are shown in Table 1. Sections from a CK-, VIM- and P-63-positive canine mammary carcinoma were used as positive controls.

Table 1. Details of the immunohistochemical reagents and methods used in this paper. AR, antigen retrieval; CK, anti-cytokeratin; VIM, anti-vimentin; p63, anti-p63

Antibody	Clone	Manufacturer	Dilution	AR Method	Incubation time (h)
CK	AE1/AE3	Dako	1:200	Pressurized (125°C)	18
VIM	V9	Dako	1:20000	Pressurized (125°C)	18
p63	4A4	Dako	1:100	Pressurized (125°C)	18

For vimentin and cytokeratin antibodies, a semiquantitative method was used and neoplasms were classified as negative (-), positive with focal or multifocal staining (+) and positive with diffuse staining (++)

The sample measured 3.0 x 3.0 x 1.2cm. It had firm consistency, was firm to cut and had smooth and white surface. Microscopically, several tissues containing pleomorphic and atypical neoplastic cell proliferation were observed. Anisocytosis, anisocariasis and nuclei with loosely aggregated chromatin were also observed. The cells presented arrangement in nests and anastomotic trabeculae of polyhedral cells, sometimes presenting individual dyskeratosis. Moreover, spindle cells immersed in strongly amorphous rosin material compatible with desmoplastic mesenchymal cells were also observed, as well as areas with cells contained in gaps within compatible osteoid and chondroid matrices (Figure 1A, B and C). Considering the presence of atypical neoplastic cells from at least two different embryonic origins it was characterized as a malignant teratoma.

The observed epithelial tissues were positive for cytokeratin (Figure 1D) and mesenchymal tissues positive for vimentin (Figure 1E). In some areas composed of nests of epithelial cells, layers of surrounding cells were positive for p63 (Figure 1F), suggesting their probable progenitor origin.

## DISCUSSION

Teratomas are rare neoplasms in dogs. They are generally composed of histologically well

differentiated and benign tissue (Nagashima *et al.*, 2000). Teratomas can be classified as malignant or benign depending on the degree of differentiation or presence of undifferentiated elements that refer to those of embryonic origin (Headley *et al.* 2006). Malignant teratomas contain less distinct embryonic elements. Moreover, they contain mature structures, increased cellular atypia, and regional growth of a single tissue type (Nielsen and Kennedy, 1990). In this study, teratoma was characterized as malignant by the presence of undifferentiated areas and foci of atypical epithelial cells, as described by Newman *et al.*, 2003.

The simultaneous positive immunoreactivity for cytokeratin and vimentin confirms the origin in two embryonic leaflets - ectoderm and mesoderm, allowing the classification of neoplasia as of mixed / embryonic origin. In addition, there was positive immunoreactivity to p63. Numerous studies have demonstrated p63 expression in normal tissues. Furthermore, consistent expression has also been established in a variety of neoplasms. Patterns of tumoral p63 immunohistochemical reactivity have proven to be a useful diagnostic tool. In this study, p63 reactivity was observed in the areas that presented dyskeratosis, reinforcing the diagnosis of neoplasia as a teratoma (Emanuel *et al.*, 2006).

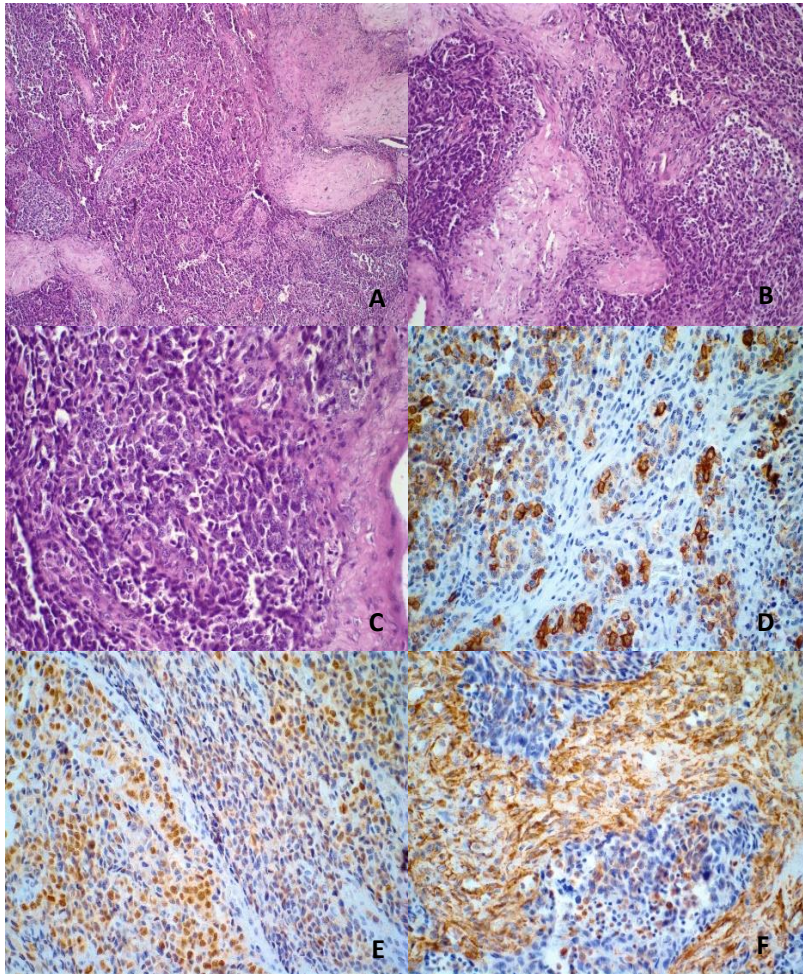


Figure 1. Extragonadal malignant teratoma in a 15-year-old female dog. A, B, C) Neof ormation composed of tissues of different origins containing proliferation of pleomorphic and atypical neoplastic cells, sometimes immersed in osteoid matrices and formation of nodes and anastomosing trabeculae HE, 10x, 20x and 40x. D) Expression of CKAE1/AE3 by epithelial cells. Mayer's Hematoxylin Countercoloration, 20x. E) Nuclear expression of p63. Mayer's Hematoxylin Countercoloration, 40x. F) Cytoplasmic expression of vimentin by spindle cells. Mayer's Hematoxylin Countercoloration, 40x.

In mammals, teratomas are typically unique and benign. Commonly, they occur in the gonads, with rare reports of malignant extragonadal teratomas (Nagashima *et al.*, 2000), which was observed in the present study. In extragonadal teratomas, pre-meiotic germ cells with diploid chromosomes that have not yet undergone the first meiotic division, or extra-embryonic or pluripotent ectopic embryonic cells are considered the cells that give rise to neoplasia (Wagner *et al.*, 1997).

## CONCLUSION

Within the conditions of the material that was submitted to surgical excision and the specimen sent to the Laboratory of Comparative Pathology it is concluded that the reported case is an extragonadal malignant teratoma that, although rare in domestic animals, should be considered in the differential diagnosis of neoplasias with little differentiation with different cell types. Moreover, it is crucial that immunohistochemical technique becomes an important tool at the conclusion of the differential diagnosis.

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