

CHEMODECTOMA IN DOGS: A CASE REPORT

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PERRONE, E.A.; XAVIER, J.G.; CHAMAS, P.C.P.; DIAS, J.L.C.
Chemodectoma in dogs: a case report. *Braz. J. vet. Res. anim. Sci.*, São Paulo, v.29, n.2, p.233-7, 1992.

SUMMARY: Chemodectoma is a neoplasm arising from the carotid and aortic bodies, having neuroectodermic origin. It has been related mainly in human beings and dogs. Among the later, the brachiocephalics are the most susceptible, mainly the ones older than six. This case reports a seven year old, male Boxer dog, presenting convulsion and dry cough. The animal died and it was sent to the Pathological Anatomy Section of the Department of Pathology at FMVZ-USP. The post-mort examination revealed the presence of hemopericardium, pulmonar oedema, hepatic and renal congestion and gall bladder oedema, but the most important feature found was the presence of 4 oviform tumoral masses, within the toracic cavity. The histopathology revealed a solid tissue, essentially cellular, with lobules delimited by delicate septa arising from bands of thick connective tissue. The neoplastic cells presented an homogeneous aspect characterized by a round or polyhedral shape with an excentric and evident nucleoli. There were few mitosis, without atypical signes. The micro and macroscopic aspects are compatible with a chemodectoma diagnosis.

UNITERMS: Heart neoplasms; Paraganglioma, nonchromaffin; Dogs

INTRODUCTION

The chemodectomas also denominated nonchromaffin paragangliomas¹⁶ are neoplasms arising from the aortic and carotide bodies, located, respectively, at the adventitia of the aorta artery and at the bifurcation of the common carotid artery¹⁶. The aortic and carotid bodies are chemoreceptor organs, being part of the paragangliom system which seems to arise from the neuroectoderm⁹. MULLIGAN¹² (1950) introduced the term chemodectoma to specify heart base tumors in dogs derived from chemoreceptors cells. Although the term suggests a preferential localization restrict to the thoracic cavity, neoplasms with histologic, histochemical and ultrastructural characteristics have also been reported in the middle ear, orbit, pancreas, urinary bladder and other sites^{4,14,16}.

Chemodectomas are described mainly in dogs, although having also been report in cats, cattle, sheep, horses, rats and in a duck¹⁶.

In dogs, the preferential site occurs at the aortic body^{13,14}. The brachycephalic breeds mainly over 6 years of age are the most susceptible ones^{7,8,9}.

The cause of chemodectomas is unknown, but the chronic hypoxia and the high altitudes have been associated with enlargement of the carotid body in humans and animals^{1,5,15}.

In dogs, the chemoreceptor tumors are frequently situated between the aorta and the pulmonary artery, at the base of the aorta artery^{9,13}. Their macroscopic aspect is variable, solitary or multiple, multinodular and encapsulated, from 0.5 to 12 cm of diameter¹⁶. They are mainly benigns, although reports of malignant tumors metastasing to lung, cortex adrenal, kidney, brain, heart, regional lymphnodes and bone have already been done^{6,17}.

The clinical signs of chemodectomas are related to congestive heart failure and haemorrhages. It includes cough, dyspnea, vomiting and cyanosis. The physical changes observed at post mortem investigation include hydrotorax, pericardial effusion, ascites, subcutaneous edema, hepatic and pulmonary congestion¹⁶.

The necropsy reveals the chemodectomas as masses, unique or multiple, located at the heart base, adventitia of aorta and common carotida arteries. The masses show variable sizes, from 0.5 to 12.0 cm of diameter. The external surface is usually smooth, whitish, while the cut surface shows areas of necrosis and haemorrhage². The microscopic examination reveals, essentially, a cellular and highly vascular neoplasm. The neoplastic cells are round and polyhedral with moderately hyperchromatic round nuclei,

scattered chromatin and indistinct nucleoli. The cytoplasm is wide, vacuolated and slightly eosinophilic ^{2,11,13,14}.

The present report relates the observation of a neoplasm located at the heart base of a seven-year old Boxer dog, that in face the clinical signs and pathological findings was diagnosed as aortic body chemodectoma.

CASE REPORT

A seven-year-old male Boxer was conducted to the Veterinary Hospital Ambulatory of the Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo, presenting unproductive cough for three weeks and one episode of convulsion preceded by vomiting. The clinical and laboratory examinations have not been done, once the animal died during the anamnesis. The post-mortem examination revealed the presence of 4 oviform tumoral masses, measuring 10x6x6, 6x4x3, 4x3x3 and 3x2x2 cm. The first two were firmly adhered at the aorta artery wall and heart base, while the other two were fixed to the mediastinum. The masses showed a nodulated external surface, gray brownish as long as the cut surface presented a variable consistence, from firm to friable, and necrosis and haemorrhage areas. Other physical changes observed were hemopericardium, hepatic and renal congestion and gall bladder oedema.

The histopathology revealed a solid tissue, essentially cellular, with lobules delimited by delicate septa arising from bands of thick connective tissue. The neoplastic cells presented an homogeneous aspect characterized by a round of polyhedral shape with an excentric and evident nucleoli. The cytoplasm showed a variable size and slightly eosinophilic granulation. There were few mitosis, without atypical signs (Fig. 1 and 2).

DISCUSSION AND CONCLUSIONS

The literature data related to the chemodectomas epidemiology indicated that these neoplasias present higher incidence in male dogs belonging to the brachycephalic breeds mainly the boxers and boston terriers over 7 years of age ^{2,8,9,13,16,17}.

Despite the lacking of clinical and/or laboratorial data due to the animal death during the anamnesis, the information got from it, that is to say, unproductive cough for 3 weeks and convulsion preceded by vomiting are compatible with the signs more frequently related, like dyspnea, dysphagia and vomiting ^{14,16}.

In relation to the gross aspects, several authors describe the chemodectomas as unique or multiple neoplasia, within the pericardial sac or on the heart base, generally presenting a smooth and whitish outer surface,

while the cut surface shows necrosis and haemorrhages areas ^{2,11,13,14}.

In the present related case, 4 oval tumor masses were verified, with variable sizes, from 10x6x6 to 3x2x2 cm, with nodulous external surface, gray brownish coloured, while the cut surface was present as a variable consistence, from steady to friable.

As for the histopathology, the morphological pattern, characteristic of the chemodectomas, is given by round or polyhedral cells closely packed together, that show wide, vacuolated, lightly eosinophilic cytoplasm and round oval nucleus, generally centralized ^{2,11,14}. Mitotic figures are rare and there are not atypical signs.

These groups of cells are enclosed by prominent trabecular branching of connective tissue that originates from the fibrous capsule. In general, these tumors are really vascular.

The histological of this case is essentially similar to the histological pattern of the chemodectomas, that is an important feature to distinguish these tumors from ectopic thyroid tumors, which, in general, are not solid, with less prominent stroma and are not consistently subdivided into small packets. Ultrastructural and immunohistochemical studies are helpful in differentiating between chemodectoma and ectopic thyroid tumors by the observation of follicle or even a colloid-containing follicle ^{3,10}.

We consider important this case report because of the lack of information about the chemodectomas in our environment and in the sense of contributing for the comprehension of the multiple of this neoplasia.

PERRONE, E.A.; XAVIER, J.G.; CHAMAS, P.C.P.; DIAS, J.L.C.
Quemodectoma em cães: relato de caso. *Braz. J. vet. Res. anim. Sci.*, São Paulo, v.29, n.2, p.233-7, 1992.

RESUMO: O quemodectoma é uma neoplasia derivada dos corpos aórticos e carotídeos, tendo origem neuroectodérmica. Tem sido relatado com maior frequência em humanos e cães. Destes, os animais braquicefálicos são os mais susceptíveis, notadamente em faixa etária superior a 6 anos. O presente relato se refere a um animal de espécie canina, de raça Boxer, macho, de 7 anos de idade, apresentando histórico de quadro convulsivo e tosse seca. O animal veio a óbito e foi encaminhado ao setor de Anatomia Patológica do Departamento de Patologia da FMVZ-USP. O exame macroscópico evidenciou a presença de hemopericárdio, congestão e edema pulmonares, congestão hepática, renal e edema de vesícula biliar. Porém, o achado macroscópico mais significativo foi a presença de 4 formações tumorais ovaladas na cavidade torácica. O exame histopatológico das formações evidenciou um tecido sólido, altamente celular, com a delimitação de lóbulos através de trabéculas conjuntivas espessas, que emitiam septos delicados subdividindo-os. As células tumorais

apresentaram-se uniformes, tendo um formato poliédrico, com núcleo grande esférico, geralmente excêntrico; nucléolo evidente, e cromatina finamente granular; citoplasma de dimensões variáveis e granulação acidofílica delicada. Foi observado pequeno número de figuras mitóticas sem sinais de atipia. Os quadros macro e microscópicos são compatíveis com o diagnóstico de quemodectoma.

UNITERMOS: Neoplasias, coração; Paraganglioma não cromafin; Cães

REFERENCES

- 01-ARIAS-STELLA, J.; BUSTOS, F. Chronic hypoxia and chemodectomas in bovines at high altitudes. *Arch. Path. Lab. Med.*, v.100, p.636, 1976.
- 02-CAMMARATA, G.; CARAMELLI, M.; CAVAZZINI, S.; CORNAGLIA, E.; VITALI, E. Neoplasie cardiache e della base del cuore nel cane: contributo casistico e studio istológico. *Clin. vet.*, v.110, n.3, p.97-116, 1987.
- 03-CHEVILLE, N.F. Ultrastructure of canine carotid body and aortic body tumors. Comparison with tissue of thyroid and parathyroid origin. *Vet. Path.*, v.9, p.166-89, 1972.
- 04-DEAN, M.J.; STRAFUSS, A.C. Carotid body tumors in the dog. A review and report of four cases. *J. Amer. Vet. Med. Ass.*, v.166, p.1003-6, 1975.
- 05-EDWARDS, C.; HEATH, D.; HARRIS, P. The carotid body in animals at high altitude. *J. Path.*, v.104, p.231-8, 1971.
- 06-GLIATO, J.M.; CRAWFORD, M.A.; SNIDER, T.G.; PECHMAN, R. Multiple organ metastasis of an aortic body tumor in a Boxer. *J. Amer. Vet. Med. Ass.*, v.191, p.1110-2, 1987.
- 07-HAYES, H.M. An hypothesis for the aetiology of canine chemoreceptor system neoplasms, based upon an epidemiological study of 75 cases among hospital patients. *J. small anim. Pract.*, v.16, p.337-43, 1975.
- 08-HAYES, H.M.; FRAUMENI JUNIOR, J.F. Chemodectomas in dogs: epidemiological comparisons with man. *J. Nat. Cancer Inst.*, v.52, p.1455-8, 1974.
- 09-HAYES, H.M.; SASS, B. Chemoreceptor neoplasia: a study of the epidemiological features of 357 canine cases. *J. vet. Med.*, A, v.35, p.401-8, 1988.
- 10-HOLSCHER, M.A.; DAVIS, B.W.; WILSON, R.B.; HUNT, K.L.; BERRY, K.K. Ectopic thyroid tumor in dog: thyroglobulin, calcitonin and neuron-specific enolase immunocytochemical studies. *Vet. Path.*, v.23, p.778-9, 1986.
- 11-MASONI, F. Cas de chemodectome aortique chez une chienne. *Point Vet.*, v.17, p.491-7, 1985.
- 12-MULLIGAN, R.M. Chemodectoma in the dog. *Amer. J. Path.*, v.26, p.680, 1950.
- 13-PATNAIK, A.K.; BIRCHARD, S.J. Canine paraganglioma: a case report. *J. small anim. Pract.*, v.26, p.681-7, 1985.
- 14-PATNAIK, A.K.; LIU, S.K.; HURVITZ, A.I.; McCLELLAND, A.J. Canine chemodectoma (extra-adrenal paraganglioma) - a comparative study. *J. small anim. Pract.*, v.16, p.785-801, 1975.
- 15-SALDANA, M.J.; SALEM, L.E.; TRAVEZEN, R. High altitude hypoxia and chemodectomas. *Hum. Path.*, v.4, p.251-63, 1973.
- 16-THEILEN, G.H.; MADENELL, B.R. *Veterinary cancer medicine*. 2.ed. Philadelphia, Lea & Febiger, 1987.
- 17-YATES, W.D.G.; LESTER, S.J.; MILLS, J.H.L. Chemoreceptor tumors diagnosed at the Western College of Veterinary Medicine: 1967 - 1979. *Canad. vet. J.*, v.21, p.124-9, 1980.

Recebido para publicação em 10/10/91
Aprovado para publicação em 09/04/92

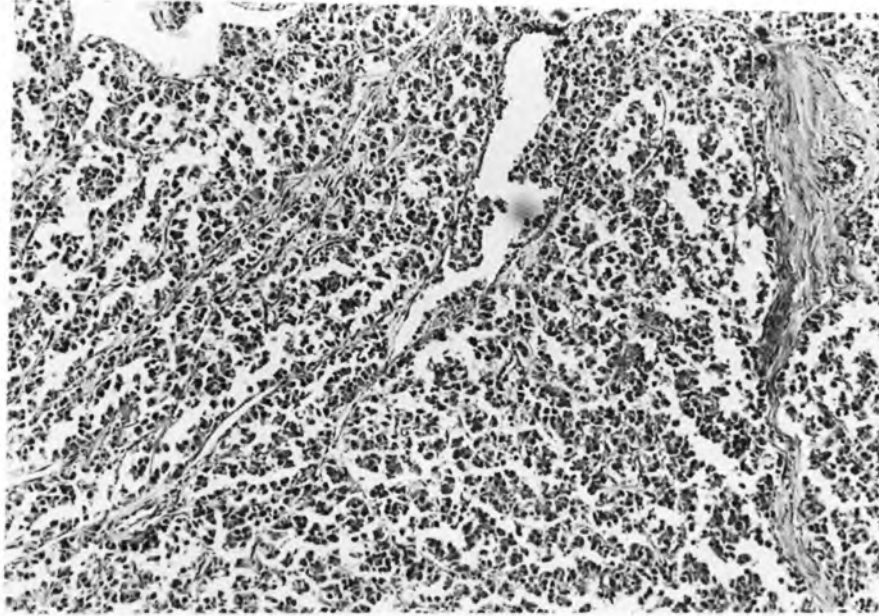


FIGURE 1 - Photomicrograph of the neoplasms. Note the solid tissue, essentially cellular, with lobules delimited by delicate septa arising from bands of thick connective tissue. HE. 165x.

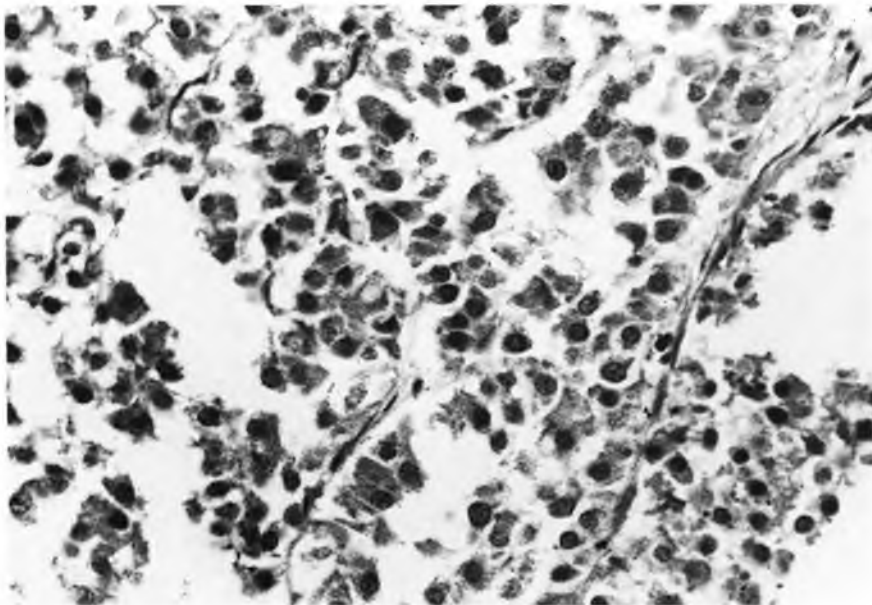


FIGURE 2 - Photomicrograph showing the aspect of the neoplastic cells, characterized by a round or polyhedral shape with an excentric nucleus. HE. 660x.