INTRANASAL OSTEOSARCOMA IN A BLOOD HOUND DOG: COMPUTED TOMOGRAPHY, CYTOLOGICAL AND HISTOPATHOLOGICAL FINDINGS

Mariana Isa Poci Palumbo[1]
Fabrizio Grandi[2]
Felipe Gazza Romão[3]
Vânia Maria Vasconcelos Machado[4]
Júlio Lopes Sequeira[5]
Luiz Henrique de Araújo Machado[6]

ABSTRACT

Osteosarcoma is a common neoplasm described predominantly in large breed dogs. Most of the cases occur in the long bones, but other anatomical locations, such as axial skeleton and extra-skeletal sites, are also described. Nasal cavity is rarely reported as being a primary site for development of osteosarcoma. Here we describe a rare case of an intranasal osteosarcoma in a dog with computed tomography, cytological and histopathological findings.

Key words: cytology, histopathology, tomography, osteosarcoma

OSTEOSSARCOMA INTRANASAL EM UM CÃO BLOOD HOUND: ACHADOS TOMOGRÁFICOS, CITOLÓGICOS E HISTOPATOLÓGICOS

RESUMO

Osteossarcoma é uma neoplasia comum descrita predominantemente em cães de raças grandes. A maioria dos casos ocorre em ossos longos, mas há descrição em outras localizações anatômicas, como esqueleto axial e sítios extra-esqueleto. Na cavidade nasal é raramente relatada como sítio primário para desenvolvimento de osteossarcoma. Aqui descrevemos um caso raro de osteossarcoma intranasal em um cão, com achados tomográficos, citológicos e histopatológicos.

Palavras-chave: citologia, histopatologia, tomografia, osteossarcoma

[1]* Pós graduanda do Departamento de Clínica Veterinária, FMVZ/UNESP-Botucatu. Distrito de Rubião Jr. S/N. Botucatu, CEP 18618-000-SP, Brasil. Telefone: (14) 8170-6918, palumboma11@yahoo.com.br
[2] Pós graduando do Departamento de Patologia, FMB/UNESP-Botucatu. Distrito de Rubião Jr. S/N. Botucatu, CEP 18618-000-SP, Brasil. Telefone: (14) 3811-6293, fgrandivet@gmail.com
[3] Pós graduando do Departamento de Clínica Veterinária, FMVZ/UNESP-Botucatu. Distrito de Rubião Jr. S/N. Botucatu, CEP 18618-000-SP, Brasil. Telefone: (14) 3811-6336. fgazza_vet@hotmail.com
[4] Prof. Dr. do Departamento de Reprodução Animal e Radiologia Veterinária FMVZ/UNESP-Botucatu, Distrito de Rubião Jr. S/N. Botucatu, CEP 18618-000-SP, Brasil. Telefone: (14) 3811-6045, vaniamvm@fmvz.unesp.br
[5] Prof. Dr. do Departamento de Patologia Veterinária FMVZ/UNESP-Botucatu, Distrito de Rubião Jr. S/N. Botucatu, CEP 18618-000-SP, Brasil. Telefone: (14) 3811-6045. sequeira@fmvz.unesp.br
[6] Prof. Dr. do Departamento de Clínica Veterinária, FMVZ/UNESP-Botucatu. Distrito de Rubião Jr. S/N. Botucatu, CEP 18618-000-SP, Brasil. Telefone: (14) 8170-6918, palumboma11@yahoo.com.br

OSTEOSARCOMA INTRANASAL EN UN PERRO BLOOD HOUND: HALLAZGOS EN LA TOMOGRAFÍA COMPUTARUZADA, CITOLOGÍA E HISTOLOGÍA

RESUMEN

El osteosarcoma es un tumor frecuente sobre todo en perros de raza grande. La mayoría de los casos ocurren en los huesos largos, pero no hay una descripción de casos en otras localizaciones anatómicas, como el esqueleto axial y sitios extra-esquelético. En la cavidad nasal es raro el relato como un sitio principal para el desarrollo del osteosarcoma. Aquí se describe un caso poco frecuente de osteosarcoma en un perro por vía intranasal con hallazgos en la TC, los hallazgos citológicos e histopatológicos.

Palabras-clave: citología, histopatología, tomografía, osteosarcoma.

INTRODUCTION

Tumors of the nasal cavity and paranasal sinuses in dogs account for about 1% of all neoplasia (1). Epithelial tumors account for 60% of intranasal tumors and non-epithelial tumors such chondrosarcoma, osteosarcoma and soft tissue sarcoma about 33.7% (2).

Osteosarcoma (OS) is a malignant neoplasm of mesenchymal origin with osteoblastic differentiation that produces osteoid matrix and accounts for 85% of all primary canine bone tumors (3).Occurs predominantly in weight-bearing sites such as the humerus, femur, radius, tibia and ulna with approximately 25% of tumours arising in the axial skeleton including the flat bones of the skull, ribs, vertebrae, sternum, and pelvis (4). Despite this, extra-skeletal sites other than long bones are also susceptible to development of the neoplasm (3,5).

There are few reports in literature concerning the development of OS in canine sinonasal region with most being described in nasal or frontal bones (6-8). The objective of this case report was to describe clinical, computed tomography scan and pathological findings in a rare case of intranasal osteosarcoma in a dog since there are no such investigation describing three diagnostic associated methods in its evaluation to date.

CASE REPORT

A 6-year-old female Blood Hound dog was brought to the Veterinary Hospital with a history of intermittent epistaxis for 6 months. Clinical evaluation revealed swelling in the nasal bone's region. Red blood cell count showed a normocytic normochromic anemia. The liver and kidney function tests and clotting time were within normal range. A computed tomography (CT) of the nasal cavity and sinuses was made, with 3 by 3 milimeters cross sections with and without intravenous iodinated contrast and a mass of irregular surface in nasal sinuses region, with nasal septum destruction, measuring approximately 5 centimeters long and 3 centimeters tall was evidenced. Soft tissue attenuation content in the left nasal sinus extending from the rostral region to the ethmoidal turbinate with nasopharynx and palate invasion, and adjacent bone irregularity suggestive of neoplastic process were also observed (Figure 1 A, B).

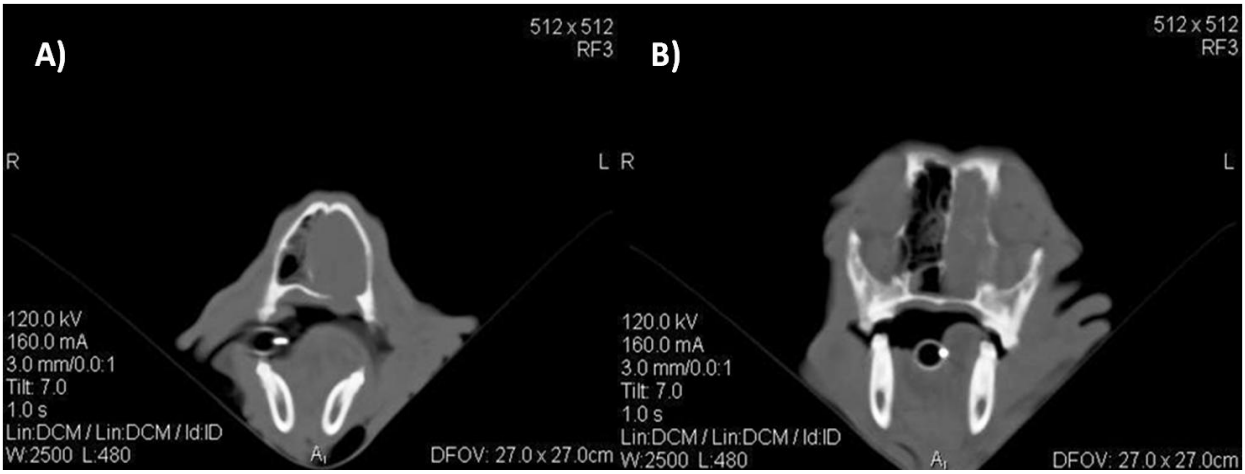

Figure 1. (A, B) Transverse CT image of a dog with nasal osteosarcoma. Characteristic content of soft tissue attenuation in left nasal sinus with oropharynx and palate invasion, and adjacent bone destruction.

Cytological samples of the intranasal mass were obtained through the fine needle aspiration cytology (FNAC) technique and stained with Giemsa's Azur-Eosin-Methylene Blue solution. The identified access window was an osteolysis area in the hard palate, adjacent to the vestibular surface of 2nd superior left premolar tooth. Cytology showed high cellularity with moderately pleomorphic mesenchymal neoplastic cells, with no defined structural arrangement, sometimes with a fibrillar eosinophilic substance (osteoid matrix) on background. There was a predominance of round to epithelioid cells presenting slightly basophilic cytoplasm in variable proportion, mostly indistinct, with fine eosinophilic granulation and/or multiple clear vacuoles of varying sizes. The nuclei were predominantly round to oval, with irregular contours, showing finely aggregated chromatin pattern, indistinct nucleoli and moderate anisokaryosis and pleomorphism (Figure 2). The cytological diagnosis was suggestive of sarcoma (osteosarcoma or chondrosarcoma). Histopathological evaluation was performed to allow definitive diagnosis and classification. The owner did not accept chemotherapy and opted for euthanasia.

Necropsy evaluation revealed an expanding mass occupying the entire left nasal sinus and measuring 5.2 x 3.3 x 2.0 cm. The mass was irregular, white-tan in color and firm to hard. Multifocally, there were several necro-hemorrhagic areas and several foci of invasion in hard palate associated with osteolysis. We were unable to determine the bone in which the tumor arose. Histological evaluation of bone tissue revealed a mesenchymal neoplasm with osteoblastic origin, infiltrative, barely delimited and located in the lamina propria of the nasal mucosa. The cells arranged themselves in multidirectional bundles or sheets and sometimes were associated to acidophilic fibrillar or amorphous matrix, this being sometimes mineralized. Cells presented strongly eosinophilic and homogeneous cytoplasm, mostly with indistinct borders, and variable size. The nuclei were round to oval with finely aggregated chromatin pattern, some presenting irregular contours, moderate anisokaryosis and pleomorphism, and indistinct nucleoli. There were rare mitotic figures. Multiple random foci of acute hemorrhage and liquefaction necrosis were observed, associated to marked quantity of degenerated neutrophils, cellular debris and few histiocytes (Figures 3A and 3B).

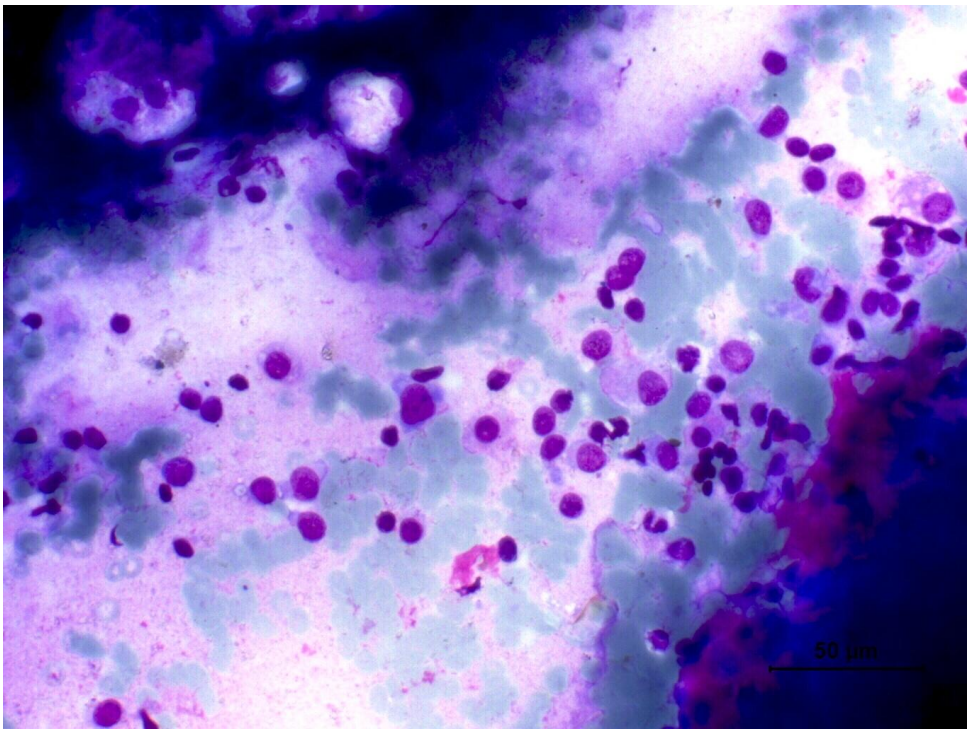

Figure 2. Fine-needle aspirate of an intranasal osteosarcoma, note the presence of round to epithelioid pleomorphic cells isolated and associated with a dense fibrillar eosinophilic background. Giemsa, 10x.

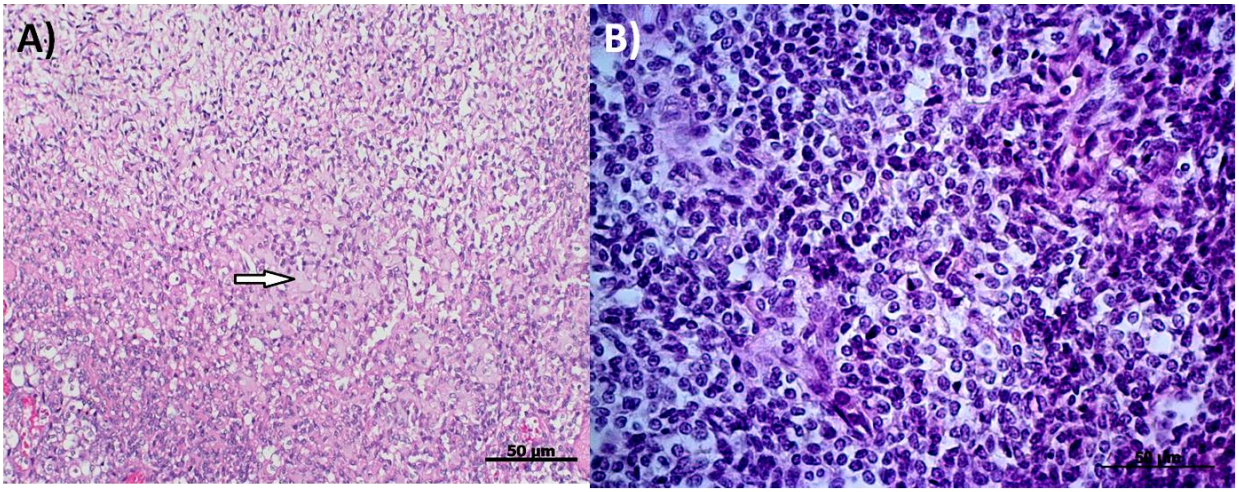

Figure 3. (A)Histopathologic sample from the intranasal osteosarcoma, note the presence of interlacing bundles of pleomorphic spindle cells and osteoid matrix (arrow) H&E, 20x. (**B**) Closer view of (A).

DISCUSSION

Osteosarcoma is a common primary bone tumor, accounting for 85-98% of all canine bone tumors (9). However, intranasal involvement is uncommonly described in both veterinary and human medicine. In a study evaluating 116 cases of canine axial skeletal osteosarcoma, the authors found 8.6% of the cases (10/116) involving nasal cavity and paranasal sinuses (8). In another one comprising 285 canine sinonasal skeletal neoplasms and

116 cases of OS, 17 cases (6%) were diagnosed as OS with involvement of nasal region alone in 9% (1/17). In 45% of the cases (5/11) of the dogs with OS the neoplasms were unilateral with the left side involved more frequently (7), similarly to that observed in our case. An average age up to 10 years and a higher incidence in medium to large-breed dogs as well are described (10). In humans, primary osteosarcoma of the nasal cavity and paranasal sinuses is a rare condition being responsible for 0,5–1% of all tumors occurring in this location (11).

There are few reports in literature regarding age, breed and sexual incidence for intranasal OS. In one study, the average age reported was 10 years-old with 50% of cases occuring in mixed breed dogs. The Blood Hound dog, described here was not mentioned among other breeds. It was also observed a 1.7:1 male to female ratio (7). In a isolated case report the neoplasm was diagnosed in a 8-year-old male Labrador Retriever (6). Despite these, accordingly to literature, development of OS other than intranasal are more commonly seen in female dogs belonging to large and giant breeds such Greyhounds, Rottweilers, Great Danes, Saint Bernards, Doberman Pinschers, Irish Setters, Golden Retrievers and German Shepherds with an age interval of 7-9 years-old (9).

The most common clinical signs associated to intranasal neoplasms are nasal hemorrhagic discharge, facial deformity, ocular discharge, sneezing, stertor, dyspnea, exophthalmos, and rarely neurologic signs (6, 7, 12). Initially we established a presumptive diagnosis for intranasal neoplasia since we could observe intermittent and progressive unilateral epistaxis and facial deformity in an older dog (10).

Primary mesenchymal tumors of the nasal cavity include fibrosarcomas, chondrosarcomas, osteosarcomas, hemangiosarcomas and, undifferentiated sarcomas (13). In general, cytology is less reliable than histology for assessment of mesenchymal tumors, but osteosarcomas can often be diagnosed with confidence on examination of fine needle aspiration smears (5). Cytologic differential diagnosis in this case included osteosarcoma and chondrosarcoma, since these two types of sarcomas usually exfoliate small clumps or individual pleomorphic cells that have abundant basophilic cytoplasm and can present either fine acidophilic to purple granules or multiple, small clear vacuoles (14).

Osteosarcomas may vary widely in their histological appearance, and can be classified principally upon their cellular arrangement and morphology. Osteoblastic osteosarcomas accounted for 17.64% (3/17) of all cases, being characterized by a major component of osteoid tissue with anaplastic and pleomorphic malignant cells characterized by vesiculated nuclei and large nucleoli (7). In non-productive osteoblastic osteosarcomas, areas of malignant osteoid tissue might be very difficult to found (5,7). Despite this we can also observe rare areas with chondroid differentiation. Although tumor matrix can contain variable quantities of cartilage and collagen, these features were not observed in this case.

CT scan is strongly recommended to support the diagnosis and evaluate the extent of nasal cavity neoplasms (12). CT is typically superior to magnetic ressonance (MRI) for bone evaluation of the head and areas of bone destruction (15). Due to the lack of mobile hydrogen protons in compact bone, MRI depicts the cortices of bones as a signal void and is usually less suitable to bone imaging than CT (16). CT is quite useful for the evaluation of tumors of the cranium especially to reveal intracranial extension and to plan surgical or radiation therapy (17). Additionally volumetric tumors analysis can be performed with CT images (18).

Although malignant neoplasms of the nasal cavity, especially osteosarcomas, represent rare conditions it should be considered in the differential diagnosis of chronic nasal cavity and sinus disease. The locations and extent of these neoplasms should be evaluated by CT scan in association with cytological and histopathological analysis in order to achieve an accurate final diagnosis.

REFERENCES

1- MacEwen EG, Withrow SJ, Patnaik AK. Nasal tumors in the dog: retrospective evaluation of diagnosis, prognosis, and treatment. J Am Vet Med Assoc. 1977;170:45-8.

2- Fujita M, Takaishi Y, Yasuda D, Hasegawa D, Taniguchi A, Takahashi K, et al. Intranasal hemangiossarcoma in a dog. J Vet Med Sci. 2008;70:525-8.

3- Selvarajah GT, Kirpensteijn J. Prognostic and predictive biomarkers of canine osteosarcoma. Vet J. 2010;185:28-35.

4- Dickerson ME, Page RL, LaDue TA, Hauck ML, Thrall DE, Stebbins ME, et al. Retrospective analysis of axial skeleton osteosarcoma in 22 large-breed dogs. J Vet Intern Med. 2001;15:120-4.

5- Meuten DJ. Tumors in domestic animals. In: Thompson KG, Pool RR. Tumors of bones. Iowa: Iowa State Press; 2002. p.245-317.

6- Dycus DL, Akin EY, Crabtree AC, McEwen VK. What´s your neurological diagnosis: intranasal osteosarcoma. J Am Vet Med Assoc. 2010;237:37-9.

7- Patnaik AK, Lieberman PH, Erlandson RA, Liu SK. Canine sinonasal skeletal neoplasms: chondrosarcomas and osteosarcomas. Vet Pathol. 1984;21:475-82.

8- Heyman SJ, Diefebderfer DL, Goldschmidt MH, Newton CD. Canine axial skeletal osteosarcoma. A retrospective study of 116 cases (1986 to 1989). Vet Surg. 1992;21:304-10.

9- Morello E, Martano M, Buracco P. Biology, diagnosis and treatment of canine appendicular osteosarcoma. Similarities and differences with human osteosarcoma. Vet J. 2011;189:268-77.

10- Lana SE, Withrow SJ. Tumors of the respiratory system - nasal tumors. In: Withrow SJ, Macewen EG. Small animal clinical oncology. 3ª ed. Philadelphia: Saunders; 2001. p.370-7.

11- Vlychou M, Ostlete SJ, Kerr R, Athanasou NA. Low-grade osteossarcoma of the ethmoid sinus. Skelet Radiol. 2007;36:459-62.

12- Elliot KM, Mayer MN. Radiation therapy for tumors of the nasal cavity and paranasal sinuses in dogs. Can Vet J. 2009;50:309-12.

13- Norris AM. Intranasal neoplasms in the dog. J Am Anim Hosp Assoc. 1979;15:231-6.

14- Raskin RE, Meyer DJ. Canine and feline cytology. A color atlas and interpretation guide. St. Louis: Saunders Elsevier; 2010.

15- Chong VF, Fan YF, Khoo JB. MRI features of cervical nodal necrosis in metastatic disease. Clin Radiol. 1996;51:625-31.

16- Makow LS. Magnetic resonance imaging: a brief review of image contrast. Radiol Clin North Am. 1989;27:195-218.

17- Hudson JA, Montgomery RD, Hathcock JT, Jorboa JM. Computed tomography of craniomandibular osteopathy in a dog. Vet Radiol Ultrasound. 1994;35:94-9.

18- Chua DT, Shanm JS, Kwong DL, Tai KS, Wu PM, Lo M, et al. Volumetric analysis of tumor extent in nasopharyngeal carcinoma and correlation with treatment outcome. Int J Radiat Oncol Biol Phys. 1997;39:711-9.

Recebido em: 11/07/11
Aceito em: 11/11/11