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Multilobular Bone Tumor in Dogs: A Mini Review

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ABSTRACT

Multilobular bone tumor, also known as multilobular osteochondrosarcoma or chondroma rodens, it is a slow growing, locally invasive, malignant tumor capable of compressing and invading adjacent tissue. Its occurrence is higher in the flat bones of the skull and hard palate. Clinical signs depend on the location of the tumor and are usually related to compression of adjacent structures. Radiographic evaluation and computed tomography of the skull and chest are essential for surgical planning and research for metastases. Confirmation of suspected multilobular bone tumor is performed through histopathological analysis. Treatment involves resection of the tumor with wide surgical margins, since chemotherapy and radiotherapy are not effective. The prognosis of animals affected by this disease is not the best, since local recurrence or distant metastasis may occur, a fact that should be alerted to the animal's tutor.

Introduction

The multilobular bone tumor is an uncommon bone neoplasm that affects dogs, with slow growth, being locally invasive and with malignant potential and high recurrence rate, occurring more frequently in the flat bones, mainly of the skull, although it can affect less frequently the bones of vertebrae, pelvis, penile bone, and palate [1-4]. The multilobular bone tumor has different alternative names such as chondroma rodens, multilobular osteoma, multilobular osteochondrosarcoma, calcifying aponeurotic fibroma and juvenile aponeurotic fibroma [5,6]. This type of tumor most often affects medium or large breed dogs and rarely in giant and small breeds, being more common in middle-aged to elderly animals [7,8]. In most cases, this tumor recurs locally after surgical excision, in addition to having a great capacity to metastasize to distant tissues and organs such as the lungs [9,10]. Normally, on clinical inspection and palpation, this tumor appears as a solid and immobile mass with a nodular appearance on the surface of the skull bones (Figure 1) [1,2,11-13]. Depending on its location, the tumor can lead to the development of different clinical signs and symptoms in affected dogs, which range from difficulty in chewing, obstruction of nasal sinuses, neurological signs, exophthalmos and disfigurement of the face and head due to the tumor mass being extremely protruding [8,14].

Diagnosis

The laboratory tests usually requested include blood count and serum biochemistry to assess alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, urea, creatinine, albumin and total protein levels. The increased levels of alkaline phosphatase [15] or increased expression of p53 by immunohistochemistry [7,16] in biopsied tumor tissue samples aid in tumor grading but are not conclusive for a definitive diagnosis of multilobular bone tumor. For a better aid in the diagnosis, imaging tests such as radiographic evaluation (Figure 2A), computed tomography and magnetic resonance imaging (Figure 2B) are indicated [17,18]. Through these tests, it is possible observe the location of the bone tumor,

involvement of adjacent structures or metastasis presence [19,20]. Imaging exams are essential for diagnosis establishing, surgical planning and investigation of metastases, leading to the owner's guidance about the best procedure to be performed [1,17,18,20-22]. Macroscopically the tumor appears in the form of whitish to yellowish nodules with variable sizes, separated by collagenous septa of different thicknesses (Figure 3) [11]. The definitive diagnosis is confirmed histologically, where a mesenchymal proliferation is observed with stretches forming lobular outlines outlined by bundles of fusiform cells (Figure 4A). Inside the lobules, an atypical cartilaginous component, areas of ossification and foci with immature osteoid matrix are visualized, containing tumor cells with a fusiform or rounded appearance, with rounded to oval nuclei (Figure 4B) [6,12,19,23]. After histological confirmation of multilobular bone tumor, the owner should be instructed about the patient's prognosis and periodic follow-up by the veterinarian in search of local recurrence and metastases (Figure 5) [9,10,20].

Figure 1: Pre-surgical macroscopic appearance of the volume increase superimposed on the topography of the left zygomatic arch and the caudal portion of the left mandibular ramus in a 9-year-old Yorkshire Terrier dog breed. Font: Errante (2021).

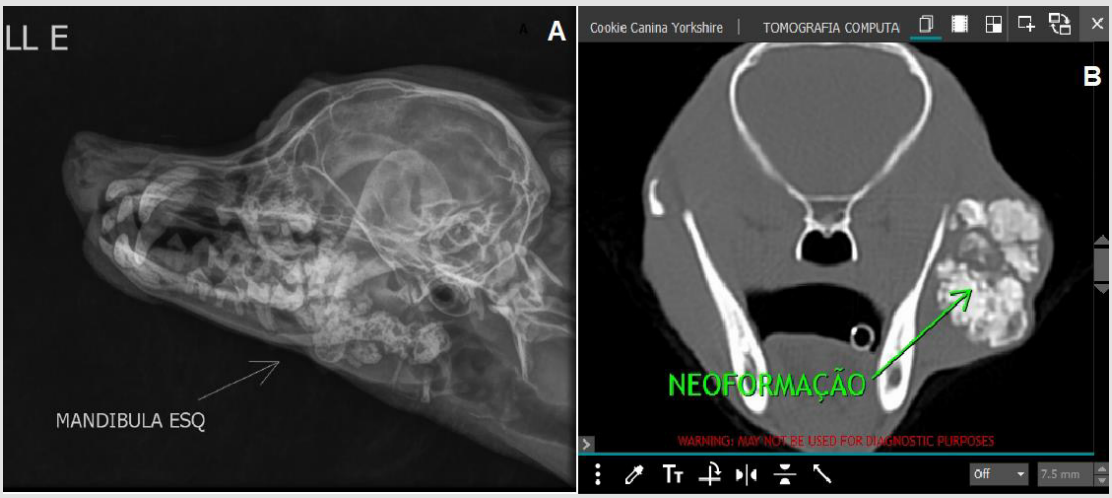

Figure 2:

A. Radiographic evaluation by left lateral view. Presence of irregular and amorphous bone proliferation superimposed on the topography of left zygomatic arch and caudal portion of the left mandibular ramus (white arrow)

B. Computed tomography in the coronal plane. Presence of amorphous, multilobulated bone proliferation, with regular margins and defined limits, affecting the left zygomatic arch (green arrow). Font: Errante (2021).

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Figure 3: Macroscopic appearance. Presence of whitish to yellowish nodules, of variable sizes, separated by collagenous septa of different thicknesses. Font: Errante (2021).

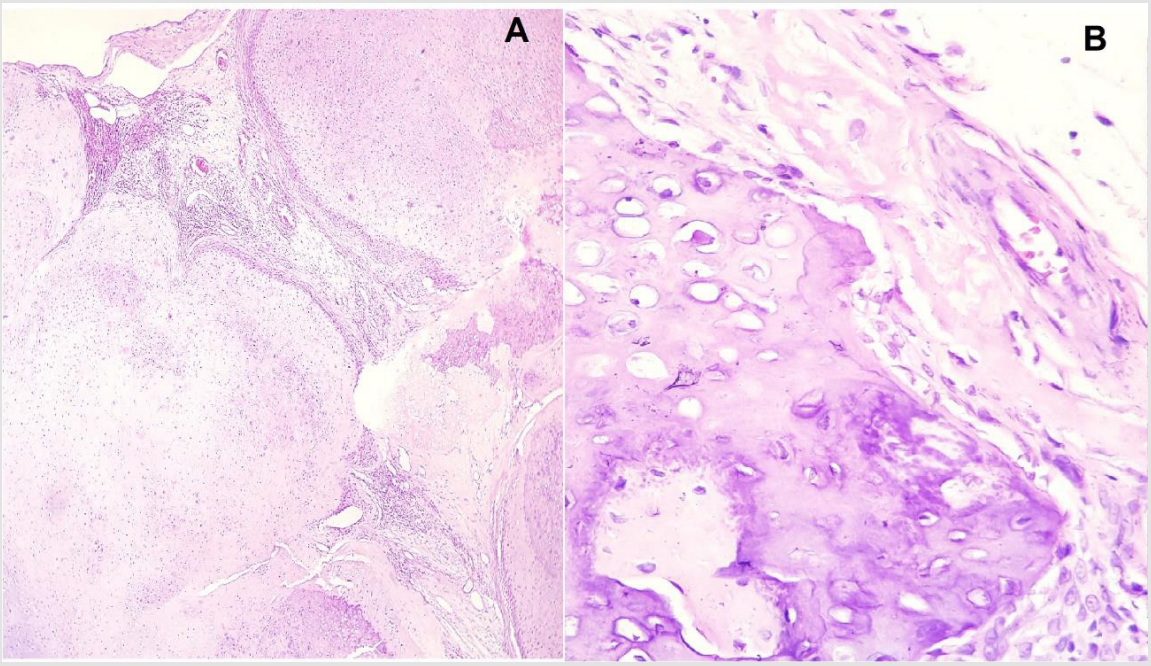

Figure 4: Microscopical appearance of the multilobular bone tumor.

A. Mesenchymal proliferation with expansive growth, with stretches forming lobular outlines delineated by bundles of fusiform cells. Inside the lobes, presence of atypical cartilaginous component, areas of ossification and foci with immature osteoid matrix (Hematoxylin/Eosin stain, 4x magnification).

B. Presence of tumor cells with a fusiform or rounded appearance, with rounded to oval nuclei (Hematoxylin/Eosin stain, 40x magnification). Font: Errante (2021).

Figure 5: Computed tomography of the chest. Presence of an amorphous structure of mixed attenuation (water and bone), with a multilobulated appearance in the dorsal portion of the left caudal lung lobe (green arrows). Font: Errante (2021).

Treatment

When possible surgical removal of the tumor mass with a wide margin of safety is indicated [1,17,18,20,21,22]. Surgical removal is often difficult due to the location of the neoplasm, and local recurrence occurs in about 50% of cases [19,24]. Despite this, aggressive surgical excision with wide margins is still considered the treatment of choice even if there is a long-term remission of tumor [22,25], since chemotherapy and radiotherapy have a disappointing clinical response and duration [2,26,27].

Conclusion

The association between the clinical signs, the imaging tests and the histopathology are fundamental to the establishment of the diagnosis of multilobular bone tumor, an uncommon tumor in the veterinary clinic of dogs.

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