

Chondrosarcoma Congenital in a Pelvic Member of one Puppy

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ABSTRACT

Background: Chondrosarcomas, malignant neoplasms of mesenchymal origin, are characterized by the proliferation of cartilage cells. They usually affect middle-aged to older dogs and large to giant breeds, rarely occurring in other age groups and small dogs. Limb amputation typically leads to survival. The diagnostic process involves clinical and orthopedic examinations, blood count, blood chemistry test, radiography, computed tomography, cytology, biopsy, and confirmation through histopathological examination. This study aimed to describe an unusual case of congenital chondrosarcoma in the calcaneal region of the left pelvic limb of a pug puppy.

Case: A 42-day-old male pug was treated for a non-ulcerated, poorly delimited, firm, and nonfluctuant nodule, with a diameter of approximately 4 cm, on the left pelvic limb. A sample of the nodular region was collected by fine-needle aspiration cytology, with findings suggestive of malignant mesenchymal neoplasia. Radiographic screening did not detect metastases. Pelvic limb amputation was performed 10 days after the examinations, and the operation was uneventful. A tumor mass sample was sent for histopathological examination. Microscopic examination revealed proliferation of fusiform to stellate mesenchymal cells in a desmoplastic fibrous stroma and a nodular area of irregular hyaline cartilage formation. One month following surgery, the patient presented with dyspnea, cough, and pale mucus membranes. A follow-up radiographic ventrodorsal thoracic study revealed a multinodular interstitial pattern in the right lobes, compatible with metastatic nodules. The histopathological findings were compatible with chondrosarcoma. Owing to its condition, the animal was euthanized.

Discussion: The diagnosis of chondrosarcoma is established based on clinical signs and macroscopic, cytological, and histopathological findings. Chondrosarcomas typically affect large-breed, adult, or older dogs and rarely occur in young, small-breed animals, which highlights the rarity of the presented case, where the patient was a 42-day-old pug. Skeletal chondrosarcomas affect the nasal cavity, which is the most common site in dogs, followed by the ribs, long bones, pelvis, vertebrae, digits, and penile bone. In the present case, the tumor was located in the pelvic limb, within the region of the long bones. Chondrosarcomas in limbs typically present with pain and lameness of the affected limb. However, despite the nodule's size relative to the animal, lameness and pain were not reported. Chondrosarcomas are slowly progressing neoplasms with a low incidence of metastasis, accounting for approximately 18% of cases in dogs. Even after amputating the affected limb, an effective treatment option, the patient exhibited an extremely rapid and aggressive clinical progression, which included dyspnea and cough, leading to confirmation of pulmonary metastasis through chest radiography. This finding contradicts the existing reference literature, which suggests the rarity of metastases in these cases. The presented case represents an atypical presentation of malignant neoplasia in a young pug when compared with literature data. The etiology of this neoplasia remained undetermined in this patient, which underscores the importance of this case report and highlights the need for further studies to determine the origin of such neoplasias in puppies.

Keywords: amputation, chondrosarcoma, mesenchymal, neoplasm.

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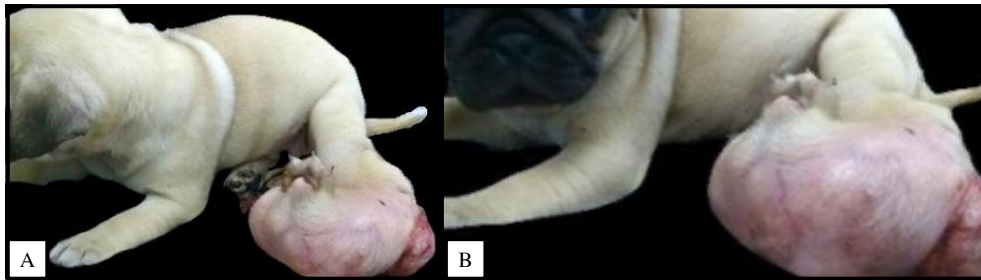


Figure 1. A- Appearance of the nodule on the distal left pelvic limb of the canine. B- Enlarged view of the nodule.

INTRODUCTION

Chondrosarcoma is a malignant neoplasm of mesenchymal origin that affects domestic animals and humans. This neoplasia is characterized by the proliferation of cartilaginous cells that produce chondroid extracellular matrix and neoplastic fibrillar extracellular components. Primary chondrosarcoma may develop in skeletal sites [7,10] or, less frequently, in extraskelatal tissues [5].

The age range of affected dogs varies from 6 months to 14 years; however, it is more commonly reported in middle-aged and older animals [4]. Medium to large breed dogs are more frequently affected, and the condition is considered rare in small breeds.

Diagnosis includes clinical and orthopedic examination, complete blood count, biochemical testing, radiographs of the affected site and thorax, computed tomography, cytology, and bone biopsy. However, histopathological examination is the only method that provides a definitive diagnosis [2].

When a primary bone lesion is suspected, differential diagnoses should include bacterial or fungal osteomyelitis, bone infarction, direct extension of soft tissue tumors into bone, metastatic bone tumors, hypertrophic osteopathy, and hypervitaminosis. Traumatic periosteal reactions and bone cysts should also be excluded [8].

This case report describes the occurrence of chondrosarcoma in the distal left pelvic limb of a 42-day-old pug.

CASE

A 42-day-old male pug weighing 1.4 kg was admitted to a veterinary hospital in Porto Alegre, Rio Grande do Sul. Physical examination revealed a nonulcerated, poorly demarcated, firm, nonfluctuant nodule approximately 4 cm in diameter on the left pelvic limb. During anamnesis, the owner reported that

the patient had exhibited this abnormality since birth, with progressive enlargement over time.

The patient's clinical parameters were within normal limits, and the animal was active. A fine-needle aspirate was collected for cytology. The sample revealed mesenchymal fusiform cells, occurring singly and in clusters, along with a small number of erythrocytes and abundant collagen fibers. These findings were suggestive of a malignant mesenchymal tumor.

Seven days later, the patient returned for imaging and tumor staging prior to the planned surgical removal of the neoplasm. At this visit, the mass had increased considerably in size (Figure 1).

Thoracic radiographs (ventrodorsal and lateral projections) revealed an enlarged cardiac silhouette, suggesting cardiomegaly, and pulmonary changes compatible with an allergic process (Figure 2). Abdominal ultrasonography was unremarkable.

Approximately 10 days after the imaging examinations, the patient underwent amputation of the left pelvic limb. The procedure was completed without anesthetic or surgical complications (Figure 3). The excised limb was submitted for histopathological evaluation.

Microscopically, the mass consisted of lobular formations demarcated by desmoplastic fibrous stroma, containing proliferating mesenchymal cells with

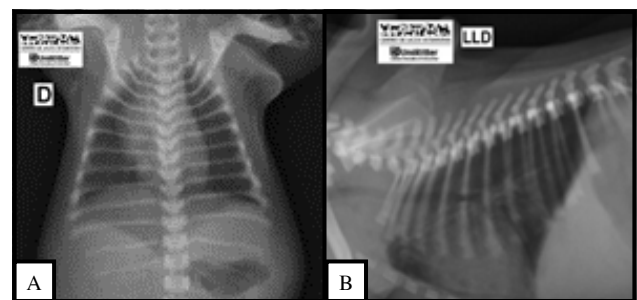


Figure 2. Thoracic radiograph taken to assess possible metastasis, showing changes in the cardiac silhouette and pulmonary fields, suggesting an inflammatory process.

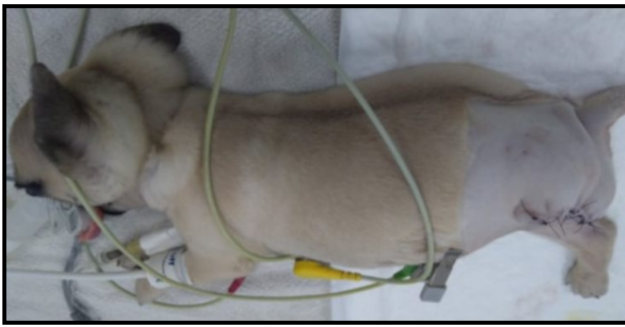


Figure 3. Patient in the immediate postoperative period following left pelvic limb amputation.



Figure 4. Ventrodorsal thoracic radiograph showing a multinodular interstitial pattern.

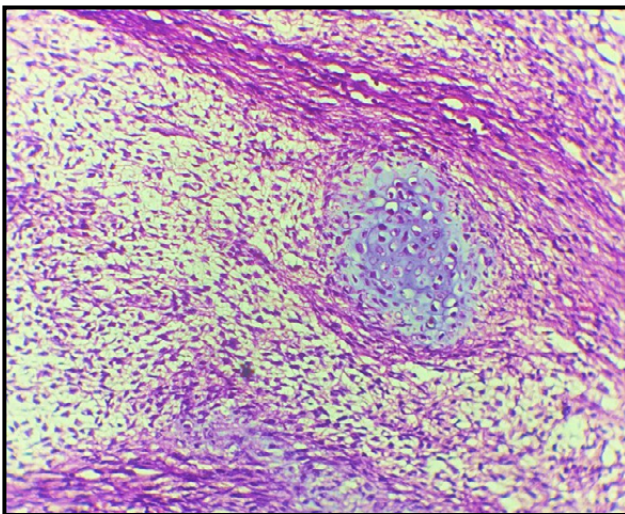


Figure 5. Histological image showing proliferation of mesenchymal cells with fusiform to stellate morphology within a desmoplastic fibrous stroma and abundant myxoid matrix. Nodular areas of hyaline cartilage are also visible [HE; Obj.40x].

fusiform to stellate morphology. These cells exhibited scant eosinophilic cytoplasm, irregular elongated nuclei with prominent nucleoli, and mitotic figures ranging from 7 to 20 per high-power field (40×). The cells were arranged within an abundant myxoid matrix, forming firm nodules composed predominantly of rounded to polygonal cells with scant basophilic cytoplasm and large, round nuclei with prominent nucleoli. Multifocally, irregular hyaline cartilage nodules were observed within the mass. Extensive necrotic and hemorrhagic areas were present, extending up to the superficial dermis beneath the ulcerated epithelium.

Histopathological examination confirmed a diagnosis of chondrosarcoma. Oncologic follow-up and chemotherapy sessions were initiated.

One month post-operation, the patient returned with dyspnea. The owner reported onset of respiratory distress two days earlier, accompanied by coughing, pale mucous membranes, and open-mouth breathing. A thoracic radiograph [ventrodorsal projection only, due to intense dyspnea (Figure 4)] revealed a multinodular interstitial pattern, with the largest nodule measuring 1.9×1.87 cm in the right lung lobe, suggestive of metastatic disease.

Due to the extremely poor prognosis and rapid clinical deterioration, euthanasia was elected. Necropsy and histopathological examination of the pulmonary nodules were not authorized by the owner, preventing confirmation of metastasis (Figure 5).

DISCUSSION

Chondrosarcoma is most commonly observed in medium to large breed dogs weighing 20-40 kg, including Boxer, Golden Retriever, and German Shepherd breeds [3]. It is rare in small or giant breeds [10]. It typically occurs in middle-aged to older dogs, with a mean age of 7.2 years, and has no known sex predisposition [2]. Thus, the present case is extremely unusual and differs from what is commonly reported in the literature.

Skeletal sites commonly affected by chondrosarcoma include the nasal cavity (the most frequent site), followed by ribs, long bones, pelvis, vertebrae, digits, and the os penis [9]. In this case, the tumor affected the left pelvic limb. Chondrosarcoma of the limbs is generally painful and may cause lameness [10]; however, in this patient, no pain or lameness was observed despite the relatively large size of the mass.

Chondrosarcomas typically progress slowly and exhibit a low metastasis rate of approximately 18% in dogs [6]. In contrast, this patient demonstrated rapid progression and clinical signs of dyspnea and coughing, with radiographic evidence suggestive of thoracic metastasis, contrary to typical reports.

The etiology of chondrosarcoma is unknown, although multiple cartilaginous exostoses may be a risk factor [3]. In this case, the exact origin of the tumor could not be determined. Its occurrence in a very young, small breed dog highlights its atypical nature. Histopathological confirmation of malignancy supports the aggressive clinical course observed.

Treatment depends on disease staging and the patient's clinical condition. Amputation of the affected limb is considered the best curative option [10] and

was pursued in this case. Chemotherapeutic agents such as cisplatin, doxorubicin, bleomycin, methotrexate, cyclophosphamide, and vincristine may also be used [1]. Despite chemotherapy, the patient developed severe pulmonary lesions consistent with metastasis.

Amputation remains a valuable treatment for chondrosarcoma, as patients can achieve good quality of life with 3 limbs. This case demonstrates a rare presentation of malignant neoplasia in a very young pug, in contrast to typical reports involving adult, larger breed dogs.

Despite amputation, the clinical course in this case was extremely aggressive and rapidly metastatic.

Declaration of interest. The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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