

TWO CASES OF CANINE LIPOSARCOMAS: AN UNCOMMON TUMOR

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Summary: Liposarcomas are rare malignant tumors of adipose tissues with overall incidence of 0.2–0.5% among all the canine neoplasms. They may originate either from bone marrow or extra skeletal sites such as adipose tissues. Histological classification include well differentiated, pleomorphic, and myxoid subtypes. Clinical cytological, gross pathological and histopathological features of two extra skeletal canine liposarcoma cases presented to the Veterinary Teaching Hospital (VTH), University of Peradeniya are described here.

INTRODUCTION

Liposarcomas are rare malignant tumors of adipose tissue reported in many animal species, a majority of which are dogs and Shetland Sheepdogs are preferentially affected (Castro *et al.*, 2014. Wang *et al.*, 2005). The overall incidence of liposarcomas is 0.2–0.5% among all canine neoplasms and the mean age at diagnosis is 9.7 years (Wang *et al.*, 2005). These tumors arise *de novo* and not from pre-existing lipomas or infiltrative lipomas (Wang *et al.*, 2005). Primary bone liposarcomas are rare in dogs and may arise from the marrow cavity of the mandible, distal humerus, ulna, hock, or metacarpus (Messick *et al.*, 1989). Sub cutis, deeper soft tissue, and thoracic and abdominal cavities are the favored sites of extra skeletal liposarcomas in dogs (Messick *et al.*, 1989). Liposarcomas vary greatly in their histological pattern and the histological classification in dogs, includes well differentiated, pleomorphic (anaplastic), and myxoid subtypes (Messick *et al.*, 1989), with the myxoid type being the least common (Castro *et al.*, 2014). Well-differentiated liposarcomas contain readily recognizable adipocytes (Castro *et al.*, 2014). Pleomorphic variants have cells of highly variable morphology and they are highly invasive with a metastatic potential to distant sites (Wang *et al.*, 2005). However, metastasis is rare and when it occurs, usually affects the lung, liver, spleen and bones (Wang *et al.*, 2005). This article describes cytological, gross pathological and histopathological features of two cases of canine liposarcomas presented to the Veterinary Teaching Hospital (VTH), University of Peradeniya.

CASE REPORTS

Case 1: A 9-year-old, male, intact, German shepherd dog was presented with absence of weight bearing on the left rear limb which followed weakness and progressive difficulty in weight bearing on the same limb since three months. Palpation of the limb did not elicit pain but revealed a poorly demarcated, firm tissue growth expanded over the lateral and caudo-medial thigh area (Figure 1:A). Survey radiographs revealed partially encapsulated, mildly radio-dense compressive and expansive sub-cutaneous growth over the lateral thigh. Left femur and other skeletal structures of the left limb were unremarkable in the radiographic examination. A fine needle aspirate of the swelling was yellow and oily indicating involvement of fat tissues. Cytopathology revealed a prominent population of highly pleomorphic mesenchymal cells with a high nuclear to cytoplasmic (N: C) ratio. Cells contained moderate amount of pale staining, poorly demarcated cytoplasm with variably sized, well demarcated cytoplasmic vacuoles (cytoplasmic lipid droplets) (Figure 2). In some cells with abundant cytoplasm, the nuclei were displaced to the periphery and compressed by a single lipid droplet. The chromatin pattern varied from hyperchromatic to finely granular with one to two prominent small nucleoli. The changes were suggestive of a pleomorphic liposarcoma. Nothing abnormal was detected in hematology and blood chemistry findings. A tentative diagnosis of liposarcomas was made and surgical resection of the tumor mass was recommended.

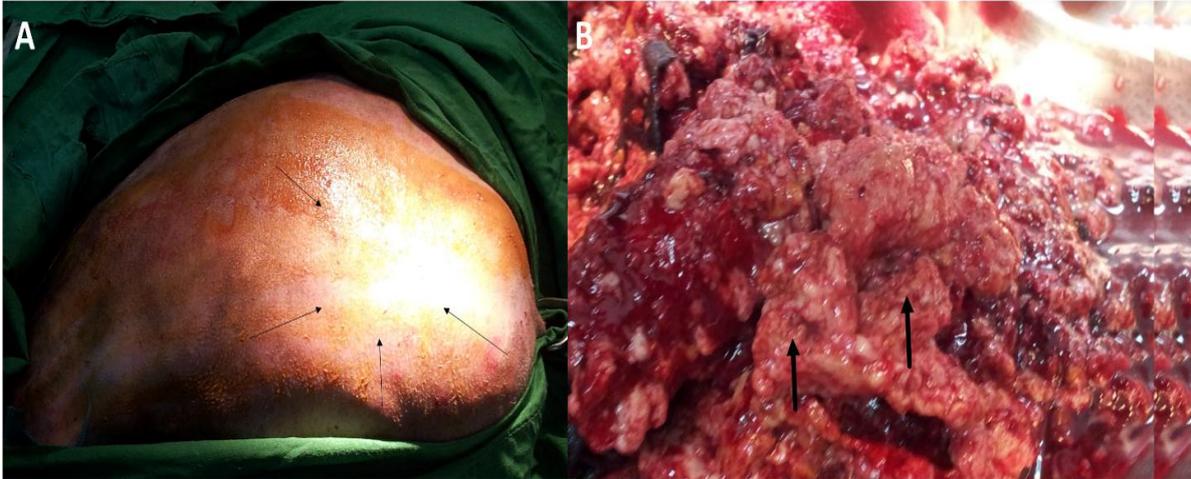


Figure 1. Case 1. **A:** Left lateral thigh area prepared for surgery, poorly demarcated tissue swelling (marked with arrows), **B:** Part of the tumor mass resected, multiple lobulated grey white masses of varying size (arrows).

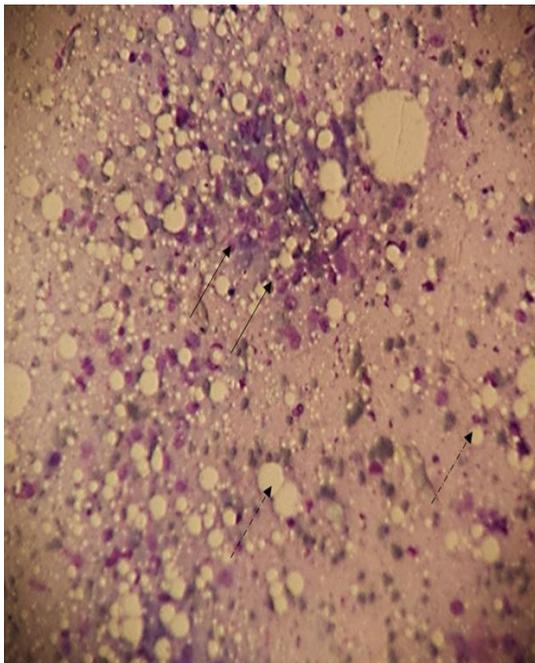


Figure 2. Fine needle aspirate of the mass stained with Leishmann x 100. Mesenchymal cells (arrows) in a background of variably sized lipid droplets (dashed arrows).

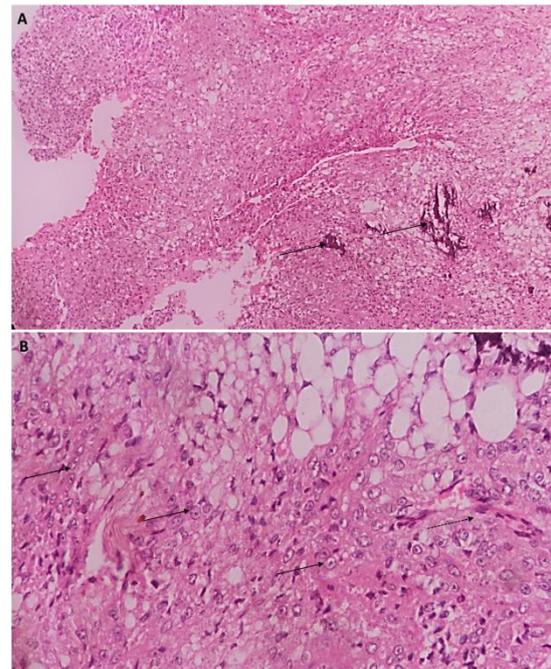


Figure 3. Case 1 Histopathology, H & E: **A:** 40X 400X. Streams of variably vacuolated spindle cells with multi-focal stromal mineralization (arrows). **B:** Plump spindle cells with prominent nuclei (arrows) Small capillary (dotted arrow) in the finely vascularized stroma separating streams of spindle cells.

Primary incisions over the left lateral thigh revealed partially encapsulated, poorly demarcated, expansive and infiltrative multiple, yellow-white, variably sized (ranging from 0.2 cm diameter to 1.4 cm diameter), firm and friable masses occupying an extensive sub-cutaneous area (Figure 1: B). The spaces between the masses were filled with a yellow, glistening, viscous fluid with a fatty consistency. The muscular anatomy of the left lateral thigh area was severely distorted due to the locally invasive nature of the mass. Poor demarcation of the tumor hindered the wide excision of the tumor with safety margins and the patient died during the surgery. Part of the resected tumor mass in 10 % neutral buffered formalin was submitted for histopathology, which revealed a

Case 2: A 11-year-old, male, intact, crossbred dog was presented with similar complaints and resembling pathology in the left thigh area as in Case 1. However, in contrast to Case 1 weight bearing ability of the affected limb was minimally intact at the time of presentation and mild pain was elicited upon palpation. Radio graphical and cytological findings were markedly similar to Case 1 and no abnormality was detected in hematology and blood chemistry findings. Surgical resection

DISCUSSION

Tumors of adipose tissue may be benign (lipoma, infiltrative lipoma and angiolipoma) or malignant (liposarcoma, that can be classified as well-differentiated, pleomorphic or myxoid) (Castro *et al.*, 2014). In the two cases reported a majority of cells were pleomorphic spindle cells with a small population of well differentiated lipocytes. Therefore, both liposarcomas were classified as pleomorphic or poorly-differentiated sub type. Liposarcoma is a rare tumor in dogs and is usually a solitary mass that tends to be highly infiltrative, firm and somewhat circumscribed (Castro *et al.*, 2014) as observed in the two cases presented. Some authors have described the presence of sub-cutaneous foreign bodies (such as microchips) and recurrent trauma as triggers or initiators of liposarcomas (Castro *et al.*, 2014). In the two cases described the history or gross pathological findings did not suggest foreign body involvement or recurrent trauma. However, both patients were presented from two geographically close locations and both dogs were vaccinated against rabies at mass vaccination programs. Therefore a reaction to vaccination could have been a responsible trigger factor.

Cytological or histological examinations are reliable and promising methods in diagnosis of liposarcomas though in some cases, the cytological

focally infiltrative, non-encapsulated, multi-lobulated neoplasm composed of polygonal to spindle cells that are solidly cellular or arranged in short streams separated by a fine fibrovascular stroma (Figure 3). Neoplastic cells had indistinct cell borders and a moderate amount of eosinophilic cytoplasm that contained one large distinct, clear vacuole or several small distinct vacuoles. Nuclei were round to oval, occasionally centrally located, and vesiculated with a prominent magenta nucleolus (Figure 3). The average mitosis was 2 per HPF. Marked anisokaryosis and anisocytosis were present. The center of the neoplastic lobule was necrotic. Multifocal mild hemorrhages admixed with few hemosiderin-laden macrophages were

evident. was done as in Case 1 and gross and histopathological findings were markedly similar except for the comparatively less extensive distribution. Post-operative care was followed with prophylactic antibiotics (Augmentin® Glaxo SmithKline, UK) 30 mg/kg IV q 12 hrs and metronidazole 20 mg/kg IV q 12hrs) and pain medication (tramadol HCl, 2 mg/kg, IV 12 hrs) and the patient was discharged 6 days after surgery. However, owners reported later that the dog died two days later.

diagnosis can be challenging due to morphological dissimilarities found in different areas of the same tumor (Castro *et al.*, 2014). Therefore, the histopathological examination is the preferred method to provide the most confirmative diagnosis. Although excision of the tumor with safety margins had been shown to be curative (Castro *et al.*, 2014) the two cases were presented at a comparatively late stage, so surgical resection with safety margins was not possible.

CONCLUSION

Wide excision of the tumor with safety margins is curative for this type of tumors. Even though most cases do not produce distant metastasis, they are highly invasive making surgical resection difficult and complicated when attempted at late stages. Therefore, early detection warrants for surgical resection with wide margins and complete removal of the neoplasm could be curative.

ACKNOWLEDGEMENT

We would like to thank Mr. Manjula Dhanasekara, in the division of veterinary surgery, Veterinary Teaching Hospital for his support with the photographs.

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