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CASE REPORT

An Unusual Case Report of Primitive Jejuneal Canine Osteosarcoma

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ABSTRACT

Extraskeletal osteosarcoma (also called extraosseous osteosarcoma or soft tissue osteosarcoma) is a rare primary malignant mesenchymal neoplasm arising in soft tissues with histologic features resembling primary osteosarcoma of bone but without any direct relation to bony structures. It is much rarer than either soft tissue sarcoma or skeletal osteosarcoma. It can produce osteoid, bone or chondroid material. The pathogenesis of this tumor is still uncertain and in humans they are considered both clinically and therapeutically distinct from primary osseous osteosarcoma. In previous studies canine extraskeletal osteosarcoma accounted for 6.09% of all cases of osteosarcoma and was seen only in mammary glands. Very few cases of primary intestinal osteosarcoma have been described in dogs and other species of animals. This report describes a case of primary intestinal osteosarcoma in Cocker Spaniel dog.

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INTRODUCTION

Osteosarcoma is a malignant mesenchymal neoplasm of bone composed of malignant osteoblasts producing osteoid and immature bone (Patnaik, 1990, Turrel, 1982). Extraskeletal osteosarcoma and other primitive malignant bone tumors like chondrosarcoma are uncommon tumors in dogs (Campbell JR, 1964, Goda JS, 2011, Kuntz CA, 1998) and other animal species human enclosed (Piscitelli D., 2005, Ruiz Carazo E., 2010, Schena CJ, 1989, Stimson EL, 2000). A thirteen-year old male Cocker Spaniel dog, weighing about 20 kg., was presented with recurrent abdominal pain, associated with symptoms of depression, hypothermia (37°C), pallor, vomiting and diarrhea. Hematology and clinical chemistry revealed anemia (RBC 3.500.000/mcl, hematocrit 23%) and elevated liver enzymes (GPT, GGT, ALT). Ultrasound scan revealed the presence of abdominal fluid and a globular calcified mass of 7.0 x 8.0 x 6,5 cm. that appeared to be associated with spleen and small intestine. Plain abdominal radiographs (LL and VD projections) confirmed a hyperdense 7.0 x 8.0 x 6,5 cm. mass in the right side of the abdomen showing irregular borders and multifocal areas of calcification. No other lesions were detected in the skeleton or elsewhere in the soft tissue. Exploratory laparotomy revealed a 7.0 x 8.0 x 6.5 cm. intramural tumor that involved approximately 6 cm of the proximal jejuneum. Other findings at surgery included hemoperitoneum and slight hepatomegaly. The remaining abdominal organs appeared grossly normal. The tumor was totally excised along with the involved segment of the intestine and regional lymph nodes, and sent for histopathological examination.

MATERIALS AND METHODS

The tumor was sectioned grossly, fixed in 10% neutral buffered formalin, decalcified and embedded in paraffin. Sections of 4-5 µm were cut and stained with hematoxylin-eosin (HE). Immunohistochemistry (IHC) was performed using avidin biotin complex (ABC) method. The following primary antibodies were used: polyclonal anti-human CD117 (c-kit) (1:200; Dako, Denmark), monoclonal mouse anti-vimentin (1:250; clone V9; Dako, Denmark), and polyclonal rabbit anti-S-100 (1:1000; Dako, Denmark). 3-amino-9-ethylcarbazole (AEC Substrate-Chromogen, Dako, Denmark) was used as a chromogen and Carazzi's hematoxylin as a counterstain. Negative controls were performed in the same manner, omitting the primary antibody.

RESULTS

Exploratory surgery revealed a globular, firm and well-vascularized abdominal mass involving the small intestine and the spleen. Histopathological evaluation of the jejuneal mass revealed extensive replacement of the intestinal wall by a neoplastic population of osteoblast-like cells (Fig. 1/2) forming abundant osteoid islets (Fig. 3/4) and well-formed spicules of trabecular bone associated with diffuse areas of osteoclastic activity (Figg. 1/2). The neoplastic cells were uniformly polygonal, with irregular margins, round to oval central nuclei and small amounts of eosinophilic cytoplasm. The malignant osteoblast-like cells showed few typical and atypical mitoses. Mild lymphocytic inflammation was present. The peripheral portions of the tumor contained blood-filled cysts. The differential diagnoses considered included mesenchymal tumor with osteoblastic differentiation, extraskeletal osteosarcoma, high-grade undifferentiated sarcoma or gastrointestinal osteogenic stromal tumor. Immunohistochemical staining of the tumor for S-100 and c-kit were consistently negative. Staining for vimentin showed intense intracytoplasmatic immunoreactivity in large numbers of osteoblast-like neoplastic cells and in osteoclasts.

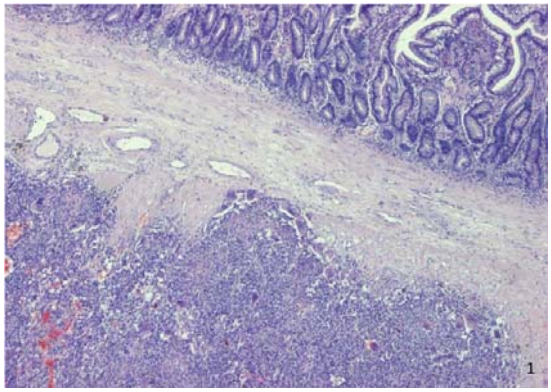

Fig. 1: Histopathology of the osteosarcoma that invaded the intestinal wall. Neoplastic cells are forming diffuse islets of osteoid inside the tumoral mass. Hematoxylin-Eosin stain, 4x.

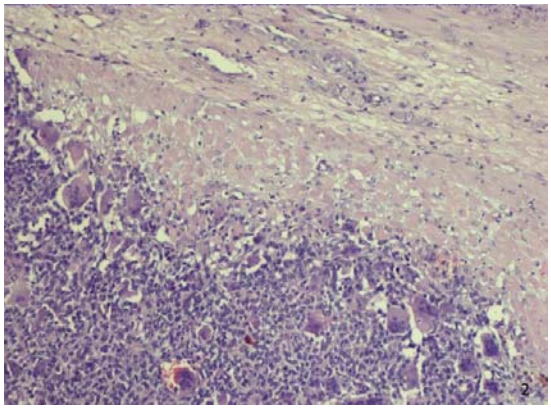

Fig. 2: Histopathology of the osteosarcoma with peripheral activation of numerous osteoclasts. Hematoxylin-Eosin stain, 10x.

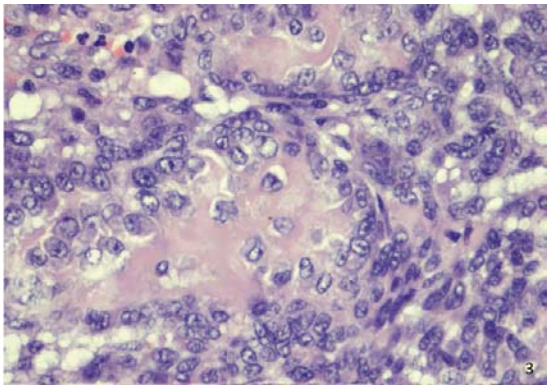

Fig. 3: Histopathology of the osteosarcoma. Osteoblast-like tumor cells that formed abundant trabecular osteoid in different phases of organization. Hematoxylin-Eosin stain, 40x.

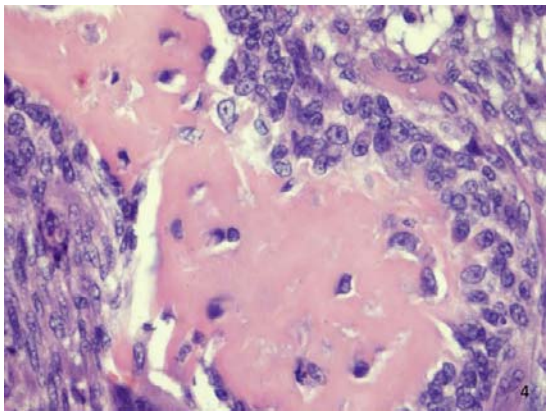

Fig. 4: Histopathology of the osteosarcoma. Osteoblast-like tumor cells that formed osteoid in phase of ossification. Hematoxylin-Eosin stain, 40x.

Based on histological and immunohistochemical findings an osteoblastic productive extraskeletal primary osteosarcoma of the jejunum was diagnosed. After surgery, the dog survived for two months and ultimately died due to the diffuse metastatic progression of the tumor.

DISCUSSION

Based on the clear appearance of osteoblast-like cells, the high level of osteoid production and the results of immunohistochemical staining, the diagnosis of extraskeletal jejuneal osteoblastic osteosarcoma was made. Osteosarcomas, according to the WHO classification, are classified on the basis of their localization either in skeletal or extraskeletal tissue. In a review of biopsies submitted to our Department over the course of 14 years (from January 1, 1991 to December 31, 2004) (Leonardi L., 2001 and Leonardi L., 2005), we reported that 6.09% of all osteosarcomas in dogs were extraskeletal osteosarcomas, which were always localized in the mammary glands Leonardi L., 2005). Clinical and radiographic findings often included a painful mass visible on plain radiographs, CT and MRI, frequently associated with calcification. The etiopathogenesis of this tumor is still unclear even in human medicine, where

cases have been described as occurring in tissue previously treated with radiotherapy for other types of tumors. This has been described as radiation-induced extraskeletal osteosarcoma, and it usually develops within 4 years after a high dose of radiation (Siraj F. et al., 2011). Traumatic lesions have also been hypothesized to be involved in the pathogenesis of extraskeletal osteosarcoma, but no history of radiation or trauma was reported for this dog. In humans extraosseous osteosarcoma has a very poor prognosis and approximately 75% of patients die of the disease within 5 years of diagnosis (Heukamp L.C. et al., 2006). Standard treatment in humans consists of amputation or wide surgical resection with adjuvant chemotherapy or radiation therapy.

This case illustrates that extraskeletal osteosarcoma can also occur in the jejunum of dogs and should be considered in the differential diagnosis of other primitive mesenchymal tumors of the abdominal cavity, and that extraskeletal osteosarcoma should be considered distinct from osseous osteosarcoma, both clinically and therapeutically. We describe this case is to remind veterinary clinicians, radiologists and pathologists of the rare case of extraskeletal osteosarcoma which can present in various forms and locations.

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