What's Your Diagnosis

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Signalment: 8 year old Male Castrated Yorkshire mix

Presenting complaint: referred for a further evaluation on a rib mass

History: The rib mass was identified by the rDVM 3 weeks before presentation. Initially, he was presented to the rDVM for pain when getting up or being picked up. A full body radiograph was taken and the rib lesion was identified at that time. The lesion aspiration was non diagnostic after multiple attempts. The CBC and Chemistry results were unremarkable. He was prescribed acetaminophen/codeine and Carprofen for pain control. He has normal urination and defecation but has been lethargic and inappetent for the last few weeks. He was castrated when he was about 3 years old. He has always been hypersensitive on touch, but the pain was new to the owners.

Physical exam: The patient was bright, alert and responsive with adequate hydration. The rest of the oral examination was not performed due to a muzzle in place. The lungs and heart auscultation is unremarkable. There's a deep soft swelling subtly palpable near the rib lesion. He has a tense abdomen and he resented when being touched along his trunk. The rectal examination revealed a mildly, symmetrically enlarged prostate that's firm and non-painful. His peripheral lymph nodes are soft and symmetrical on palpation.

Diagnostic Plan:

- The patient is sedated with Dexmedetomidine and Butorphanol for the following procedures
- Three view Thoracic radiographs:

Fig. 1 Thoracic Radiograh-Right Lateral

Fig. 2 Thoracic Radiograph-Left Lateral

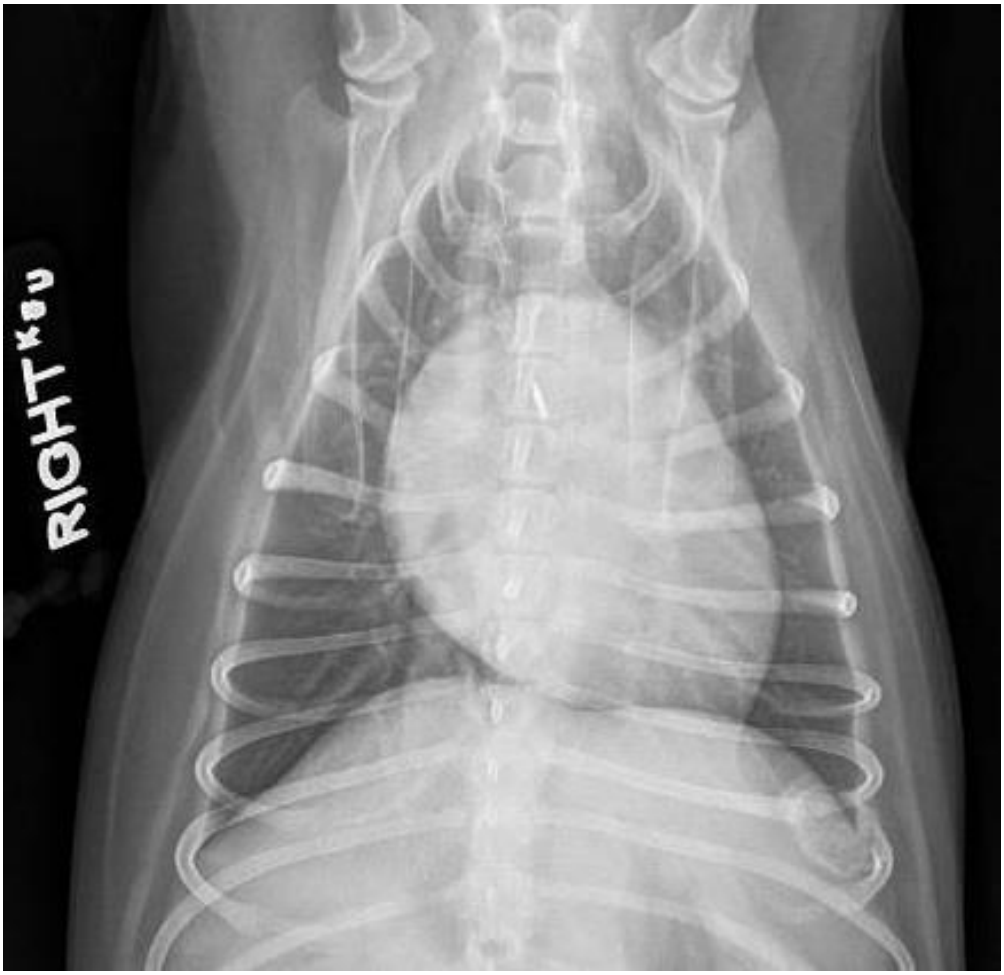

Fig. 3 Thoracic Radiograph-Ventrodorsal

- ☐ Radiographic findings:

There is an expansile oval lesion of the mid aspect of the left ninth rib with permeative lysis of the cortical margins. There are similar lesions in the right fourth rib, near the rib head, and the fifth sternebra. The pulmonary parenchyma, cardiac silhouette and pulmonary vasculature are normal. There is caudal displacement of the pylorus with undulation of the hepatic silhouette. The remainder of the cranial abdomen is normal.

- ☐ Radiographic Impressions:

Aggressive polyostotic, primarily osteolytic lesions are most consistent with metastatic neoplasia (chondrosarcoma, plasma cell tumor, others)
Hepatomegaly has differentials of nodular hyperplasia, neoplasia or endocrine/metabolic, infectious/inflammatory.

- US-Guided FNA of Rib Lesion:

- ☐ Microscopic findings:

Direct smears consist of individualized and occasionally tightly clustered cuboidal to rounded cells with anisocytosis surrounded by heavily vacuolated macrophages and scattered osteoclasts. Cells have a modest to large volume of bright blue cytoplasm. Nuclei are ovoid and centrally or paracentrally placed with a condensed chromatic pattern.

- ☐ Impressions:

Possible carcinoma, marked necrosis with macrophagic inflammation and bony remodeling. Exact origin of the rounded epithelioid cells is unclear. They may represent a primary carcinoma near the region of the bone, a metastatic carcinoma or less likely granulomatous inflammation. A surgical biopsy with histologic evaluation is recommended.

- Abdominal Ultrasound

Fig. 4 Ultrasound sagittal view of the prostate

- ☐ Ultrasound Findings:

Liver is subjectively enlarged with diffusely uniform echogenicity and echo texture. There was a single hypoechoic nodule measuring 7.6 mm in diameter. This is present within the left side of the liver and has echotexture similar to that of the normal liver. Spleen and kidneys are unremarkable. Urinary bladder is within normal limits. A single medial iliac lymph node was visualized measuring 2.5 mm in thickness. Prostate was subjectively enlarged with a normal bilobed appearance. There are several small hypoechoic lesions present within the right lobe of the prostate. There is no through transmission noted deep to these structures. Both adrenals are normal in shape, echogenicity and measurement is within normal limits.

- ☐ Ultrasound Impressions:

Hepatomegaly with primary rule outs to include endocrine or metabolic disease, nodular hyperplasia due to the single hyperechoic nodule. Less likely are cholestasis and inflammatory disease. Prostatomegaly with differentials to include: (Normal shape/bilobed appearance which is surprising for animal that has been castrated) normal, BPH (source of hormones unknown). Neoplasia unlikely. Hypoechoic lesions in the right lobe of the prostate with differentials to include cyst, hematoma, active abscesses.

- US guided FNA of the prostate:

- ☐ Microscopic Findings:
  Nucleated cells consist of cuboidal to angular epithelial cells arranged in small to medium sized clusters. The cells have round to oval nuclei, fine granular chromatic pattern and a small to medium amount of blue cytoplasm with mild anisokaryosis.

- ☐ Impressions:
  Prostatic epithelial cell proliferation with no overtly atypical features.

Conclusions: The polyostotic lesion doesn't appear to originate from either the bone or cartilage, likely a metastatic lesion from somewhere else. The abdominal ultrasound doesn't identify a primary tumor.

Follow up:

Owner wants the patient to be as comfortable and pain free as possible. Since he is hard to medicate, he is discharged with transdermal Fentanyl patch. Carprofen and Acetaminophen/codeine is continued. A palliative radiation therapy and Chemotherapy with Carboplatin and/or Toceranib phosphate (Palladia) was recommended, but owners wanted more time to think about it.

Discussion:

In the dog, skeletal metastasis is rare, whereas that's extremely common in humans. Most dogs with skeletal metastasis will have other organs involvement. Most cases with skeletal metastasis involve 1 or 2 bones but with a range from 1 to 13. The humerus, femur, and vertebrae have the highest incidence of metastatic bone disease. In long bones, the metastases are found primarily in the cancellous bone of the proximal epiphysis and metaphysis and rarely involve the diaphysis and cortical bone. This is thought to be due to the presence of well-vascularized red bone marrow in these sites. The tumors that most commonly show skeletal metastasis are mammary carcinomas, primary lung carcinomas, and prostatic carcinomas. One study also shows an increased incidence of skeletal metastasis in adrenal and hepatic carcinomas. Lumbar vertebral and pelvic metastasis is seen in a large proportion of prostatic carcinomas. Many of these dogs present clinically with difficulty in urination and defecation.

On gross examination the metastatic lesion may be only barely visible to the naked eye or may fill the medullary cavity. Lesions vary from pale white to dark red. Tumor may extend into the cortex and destroy cortical bone as well as elicit severe periosteal new-bone proliferation and marked swelling of the soft tissues. Occasionally the periosteal new-bone formation may be severe with minimal destruction of medullary bone. Often, however, bone destruction will not be found until late in the disease process. These tumors show extensive proliferation of tumor tissue in the intertrabecular spaces, with little destruction or lysis of the trabecular bone.

Most primary bone tumors in dogs are malignant, and approximate 85% consist of osteosarcomas, which are highly aggressive tumors, characterized by local invasion/destruction and distant metastasis. Osteosarcoma commonly affects the appendicular skeleton of large to giant breed dogs, but can also occur in the axial skeleton which is a more common primary site in smaller dogs. Other less common bone tumors include chondrosarcoma, fibrosarcoma,

hemangiosarcoma, liposarcoma, histiocytic sarcoma, multiple myeloma and metastatic bone tumors.

References:

1. http://cal.vet.upenn.edu/projects/saortho/chapter_77/77mast.htm

2. Bone Tumors in Dogs. Clinical Oncology Service. Ryan Veterinary Hospital of the University of Pennsylvania.