



ONCOLOGY:

Canine Osteosarcoma – Bisphosphonate Therapy

What is it?	<p>Osteosarcoma accounts for up to 85% of skeletal tumors in dogs and is the most common primary bone tumor. Median age is seven years. However, there is a small early peak in age incidence at 18 – 24 months. Large and giant breeds are classically predisposed including the Saint Bernard, Great Dane, Irish Setter, Doberman Pinscher, Rottweiler, German Shepherd and Golden Retriever. There does not appear to be a consistent sex predilection. Approximately 75% of canine osteosarcoma occurs in the appendicular skeleton, with the remainder occurring in the axial skeleton. The metaphyseal region of long bones is the most common primary site with the distal radius, proximal humerus, distal femur, proximal tibia and distal tibia the most common locations. The etiology is unknown.</p>
Clinical signs	<p>Most dogs with appendicular osteosarcoma present with lameness and swelling at the primary site. Often a mild traumatic event has occurred that disrupts the periosteum and causes microfractures of the cortical bone. Occasionally there is a pathologic fracture at presentation. Clinical signs associated with axial skeletal osteosarcoma are site specific but usually involve pain and swelling as well.</p>
Diagnostics	<p>Radiographs – 1) Codman’s triangle (elevation of the periosteum), 2) cortical lysis, 3) loss of trabecular pattern in the metaphases and 4) tumor bone extension into the soft tissues in a sunburst pattern.</p> <p>Complete blood work – Elevated alkaline phosphatase has been shown to be a negative prognostic factor in some studies.</p> <p>Three view thoracic radiographs – Rarely positive for gross metastasis at diagnosis, however, micro metastasis is likely present.</p> <p>Nuclear bone scintigraphy – Conflicting reports of usefulness and generally considered highly sensitive, but not very specific for other primary or metastatic bone lesions.</p> <p>Fine needle aspirate – Excellent for diagnosis of a sarcoma, however, rarely gives definitive answer for osteosarcoma.</p> <p>Jamshidi needle biopsy and Michelle trephine biopsy both yield over 90% accuracy rates.</p>
Treatment	<p>“Curative intent” – amputation or limb sparing surgery and adjuvant chemotherapy. Cisplatin, carboplatin and doxorubicin are the most commonly used and effective drugs.</p> <p>Palliative care:</p> <ol style="list-style-type: none">1) Oral pain medications - NSAIDs and tramadol2) Radiation therapy – Palliates pain in 74 – 92 % of dogs for 2-4 months3) Bisphosphonates <p>Bisphosphonates: Bisphosphonates are synthetic analogs of inorganic pyrophosphate that inhibit bone resorption and enhance bone mineral density by two general mechanisms: 1) they bind to hydroxyapatite crystals, which inhibits calcium and phosphorous dissolution from bone and 2) they cause apoptosis of osteoclasts.</p>

There are two general categories of bisphosphonates; 1) the more potent amino-bisphosphonates, such as pamidronate and zoledronate and the less potent non-nitrogen containing bisphosphonates, such as etidronate and clodronate.

Bisphosphonates are exclusively eliminated by renal excretion and dogs can develop a dose-dependent and infusion-length-dependent nephropathy. Bisphosphonates produce a subjective and significant improvement in pain and discomfort in 28 – 40% of dogs for 231 days.

Prognosis

The prognosis of canine osteosarcoma can be very good with aggressive therapy. Median survival times with amputation and adjuvant chemotherapy with various chemotherapeutics and protocols (cisplatin, carboplatin, doxorubicin) range from 235 – 540 days.

***References available by request.*

MVS Oncology:

Eric Bulakowski, DVM,
DACVIM

Christine Swanson, DVM

Our Oncology Service sees patients at all three locations and is available for consultations Monday through Saturday.

LOCATIONS

3412 E. Walton Blvd.
Auburn Hills, MI 48326
Ph. (248) 371-3713

29080 Inkster Rd.
Southfield, MI 48076
Ph. (248) 354-6660

1425 Michigan St. NE, Ste F
Grand Rapids, MI 49503
(616) 284-5300