



## **OSTEOSARCOMA (BONE CANCER)**

### **What is osteosarcoma?**

Osteosarcoma is a malignant cancer of the bone. In dogs, it usually occurs in the large and giant breeds, such as Great Danes, St. Bernards, Dobermans, greyhounds, retrievers and Rottweilers, but any breed can be affected. Osteosarcoma typically affects middle aged to older dogs, but young adult dogs are also susceptible. Osteosarcoma most commonly affects one of the bones of the legs such as humerus, radius, and femur. Occasionally, osteosarcoma can originate in the bones of the skull, ribs, or spine. The cause of this tumor is unknown.

### **How is it diagnosed?**

Your pet may experience persistent lameness of the affected leg and/or swelling in the region of the affected bone. X-rays of the bone will alert your veterinarian to the likelihood of osteosarcoma; however, other diseases such as bacterial or fungal infections of the bone, bone injuries, and other types of tumors can mimic the appearance of osteosarcoma on the X-ray. Thus, a bone biopsy is necessary to definitively diagnose osteosarcoma. This is a relatively quick and simple procedure, where a narrow biopsy needle is used to obtain a small sample of the bone, under general anesthesia, for laboratory analysis. Many dogs will experience increased discomfort of the leg for 2-3 days following the biopsy. Pain medications are often prescribed to help lessen the discomfort. In rare instances, fracture of the diseased bone may occur following the biopsy procedure.

Once osteosarcoma is diagnosed, X-rays of the lung are recommended, as this tumor has a high potential for metastases (spread) to the lungs. Occasionally, a technetium bone scan, to detect tumor spread to other bones, may also be recommended before therapy of osteosarcoma is considered. Routine bloodwork is always recommended to evaluate your pet's overall health and evaluate a specific enzyme (alkaline phosphatase) that may help in determining your pet's prognosis with treatment.

### **How is it treated?**

Treatment of osteosarcoma involves both surgery, to remove the primary tumor affecting the bone, and systemic chemotherapy to help delay or prevent the onset of metastases.



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### Surgery

Amputation of the affected limb is the standard treatment for osteosarcoma. Even large and giant breed dogs can function well after an amputation and most owners are pleased with their dog's mobility and quality of life following surgery. For some dogs, where amputation is not an option, limb sparing may be considered.

Limb sparing involves removal of the cancerous bone and replacement with a bone graft, which is fixed to the remaining normal bone with a bone plate. Limb sparing is usually recommended for dogs with severe preexisting orthopedic or neurologic problems that would not be functional with an amputation. Limb sparing is most successful in dogs with tumors located in the distal radius, where the tumor has not invaded more than half of the bone and has not invaded into the surrounding tissues.

### Chemotherapy

Because of the high potential for metastases, chemotherapy is recommended following amputation. Platinum chemotherapy compounds (cisplatin and carboplatin) are the standard agents used. Occasionally doxorubicin (Adriamycin) chemotherapy may be given in combination with either cisplatin or carboplatin. The current recommended treatment is carboplatin administered intravenously every 3 weeks for a total of 6 treatments. Side effects are usually minimal. Please refer to the chemotherapy handouts for more detailed information.

Metronomic chemotherapy is the administration of low doses of chemotherapy on a daily to every other day basis. There is preliminary evidence to suggest that metronomic chemotherapy may help delay recurrence or progression of cancer. We are currently recommending the use of metronomic cyclophosphamide in combination with piroxicam following completion of the carboplatin chemotherapy.

### Radiation therapy

When amputation or limb sparing is not an option for your pet, radiation therapy may be used to decrease pain and improve function of the affected leg. Radiation therapy offers pain relief for 60-70% of dogs. Pain relief and improved function may be seen immediately after the first treatment or it may take several treatments to see the effects. In those dogs experiencing a decreased pain response with radiation therapy, the effects may last anywhere between 1-6 months, with 2-3 months being average. Radiation therapy is usually administered in 5 consecutive daily treatments. Side effects are usually not observed. Please refer to the Radiation therapy handout for more information.



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### Chinese herbal medicine

When amputation or limb sparing is not an option for your pet, the use of Chinese herbal therapy may help decrease pain, slow progression of cancer and improve overall quality of life. Many patients have enjoyed 6-8 months of good quality of life with this approach.

### Pain management

Osteosarcoma is a very painful cancer. Fortunately, many options exist to provide pain relief for your pet. Usually patients are treated with a combination of a nonsteroidal medication (Piroxicam, Deramaxx, Previcox, Rimadyl) with tramadol, a narcotic pain medication. For some patients with more severe pain, gabapentin may be added in combination with the nonsteroidal and tramadol. Stronger pain medications such as codeine, morphine, hydromorphone and fentanyl may be used in cases of more severe pain. Acupuncture, bisphosphonates, and radiation may also be used for palliation of pain in patients with OSA.

### **What is the prognosis?**

Osteosarcoma is not usually a curable cancer. However, amputation and chemotherapy can give your pet many months to years of good quality of life.

Because of the high potential for metastases, amputation alone is purely palliative. Amputation of the affected limb will eliminate pain and offer good quality of life for your pet; however the development of metastases occurs on average in 3-4 months. With the addition of chemotherapy, we can extend your pet's life for an average of 10-14 months. Approximately 20-25% of dogs will live 2 years with amputation and chemotherapy. Most patients will ultimately develop spread to the lungs or other sites such as bone warranting euthanasia.

Patients that do not undergo amputation will become progressively more painful as the tumor progresses. Uncontrolled pain and poor quality life is usually the cause for euthanasia. Pathologic fracture of the affected leg occurs in approximately 25% of patients.