

BONE TUMORS IN DOGS

Bone cancer is relatively common in dogs, especially large breeds. The biological behavior, prognosis, and treatment of bone tumors depends on tumor type, location of the tumor, and extent of disease or “stage” at the time of diagnosis. Approximately 85% of bone tumors in dogs are fall under a specific tumor type call osteosarcoma (*osteo = bone, sarcoma = cancer*). This also the most common bone tumor seen in human oncology. Like their human counterpart, osteosarcomas are highly aggressive tumors, characterized by painful local bone destruction and later spread to other bones or organs such as the lungs (distant metastasis). The most common bones for osteosarcoma to occur are the long bones of the limbs, however, osteosarcoma ultimately can occur in any bone (skull, ribs, vertebrae, pelvis) and even soft tissues within the body (spleen, mammary gland, kidney, skin).

The signs associated with a bone tumor are often nonspecific and at least initially, difficult to differentiate from arthritis or a potential sprain or strain after activity. Tumors in the limbs often cause various degrees of lameness and pain, and a firm swelling may become evident as the tumor size increases. It is common for pain to be intermittent initially, and it may improve initially with pain medications prescribed by your veterinarian. As the degree of discomfort increases, it can cause other signs such as irritability, aggression, loss of appetite, weight loss, sleeplessness, or reluctance to exercise. Some dogs may actually present to the veterinarian as a result of a fracture, due to weakening of the affected bone. Other clinical signs may vary, depending on the primary site and involvement of underlying structures.

Initial evaluation of a dog with a suspected bone tumor often includes: a complete physical examination, blood tests (complete blood count, serum chemistry and urinalysis), X-rays (both of the primary site and the lungs—which is the most common location for these tumors to spread), and sometimes a biopsy of the abnormal bone to obtain a definitive diagnosis. The work-up and staging are important for two reasons: it is necessary to determine the tumor type and extent of the cancer, but also provides the oncologist with information problems, all of which may influence the treatment



Pic 1: Osteosarcoma of the radius

recommendations. With regards to biopsy of the affected bone, definitive surgery (i.e. amputation or limb-sparing surgery) is often performed without a prior biopsy if the age, breed, location and the radiographic appearance of the tumor are all suggestive of osteosarcoma. Depending on the results of these initial tests, several different treatment options will likely be available ranging from aggressive (surgery followed by chemotherapy) to conservative (NSAIDs and pain medications). There are also many treatments that fall in between these two extremes, which are discussed below.

Limb osteosarcoma commonly causes lameness and pain because of invasion and destruction of normal bone. These tumors are also highly metastatic with over 90 percent of dogs ultimately succumbing to metastatic disease despite surgical removal of the primary tumor. In fact, the average dog with limb osteosarcoma will live only 4-6 months if treated with surgery alone. Surgery usually involves amputation of the affected limb, but limb sparing procedures, similar to what is done in human patients, may also be an option in selected cases. It is important to realize that *amputation is almost always well tolerated by dogs, regardless of size.*



Pic 2: Even large breed dogs can do well with amputation

The goal of surgery is two-fold; it removes the primary tumor, which is necessary for cancer control, but it also removes the source of pain, and may therefore dramatically improve quality of life. In fact, patients often seem significantly less painful immediately after surgery despite having just undergone an amputation—an otherwise major surgery. In patients where amputation is not an option, either because of concurrent conditions (i.e. already 3 legged, severe concurrent orthopedic disease, etc.) then limb sparing treatments, either surgical or through high dose radiation therapy, may be an option.

In patients where these more aggressive options are not possible, a conservative and well-tolerated form of radiation therapy, also referred to as “palliative radiation therapy” can be considered. Palliative radiation therapy has the potential to significantly improve the degree of

discomfort in approximately 75% of dogs, and the pain control lasts for an average of 2-4 months, at which time it may be repeated. This can be combined with an injectable drug called *pamidronate*, which decreases bone destruction and has been shown to can improve cancer-related bone pain in humans as well as traditional chemotherapy (carboplatin) which may further improve the duration of pain control and overall survival.

The most common cause of death is lung metastasis (spread), and as stated above, surgery (often amputation) alone results in average survival times of only approximately 4-6 months. Because of this, systemic chemotherapy is recommended following surgery for dogs with osteosarcoma. In contrast to humans, chemotherapy is unlikely to cure dogs with osteosarcoma. This is likely due to the fact that osteosarcoma in dogs are often caught late in the course of the disease. The primary goal/expectation with chemotherapy is to slow the progression of the disease while providing a good quality of life. Fortunately, chemotherapy is very well tolerated by our canine patients and it is not uncommon for dogs to appear completely normal while undergoing treatment. The most commonly used drug is an injectable medication called carboplatin, which is given once every 3 weeks for a total of 6 treatments. With this drug, less than 20 percent of dogs will experience mild, self-limiting side effects such as depressed appetite, nausea, occasional vomiting and diarrhea for a few days. Less than 5% of dogs will experience severe side effects requiring hospitalization. If your dog's side effects are impact his/her quality of life, the dosages of these drugs can be reduced in the subsequent treatments.

Following the completion of chemotherapy, we recommend pursuing rechecks every 2-3 month to insure that there is no evidence of recurrence or metastasis. The average survival time in dogs with osteosarcoma treated with surgery and chemotherapy is approximately 1 year, however 20-25% of dogs may live longer than 2 years.

Other more rare tumors that occur in the bone include chondrosarcoma (tumor of cartilage), hemangiosarcoma (tumor of blood vessels) and various other tumor types. Due to the relative paucity of these tumors in our canine patients, specific discussion of the various treatment options and prognoses associated with each are beyond the scope of this document. If you have specific questions regarding osteosarcoma or other tumor type in your pet not addressed in the article, please feel free to contact Jim Perry at jperry@aspensmeadowvet.com or via phone at 303-678-8844.