

Osteosarcoma

ABOUT THE DIAGNOSIS

CAUSE: Osteosarcoma is a painful, life-threatening cancer of bone cells. This type of cancer commonly develops in limbs (appendicular skeleton, meaning the front or back legs) of large- to giant-breed dogs and much less commonly in small dogs. Most dogs that have osteosarcoma are 7 years of age or older. Neutered dogs develop osteosarcoma slightly more often than do unneutered dogs, for a reason that is not known. Although the exact cause is unknown, osteosarcoma may be related to previous fractures and other bone diseases in some cases.

Osteosarcoma is the most common *primary* cancer of bone in dogs. This means that the cancer arises in the bone cells. It can be a very aggressive type of cancer and has a tendency to travel from the bones in the legs to distant parts of the body (metastasis). The cancer cells metastasize most commonly to the lungs and bones elsewhere in the body (axial skeleton, such as pelvis or vertebral column) through the bloodstream. They can also metastasize to nearby lymph nodes. If metastasis has occurred, the outlook (prognosis) is worse.

Note: Although primary bone tumors are rare in cats, osteosarcoma is the most common type. In cats, this cancer does not usually metastasize, and removal of the tumor through surgery (often requiring limb amputation) can be permanently curative.

SYMPTOMS: Because the primary disease affects bones of the limbs, the most common symptoms include lameness (also called limping or favoring a leg) and a hard swollen lump on a front or rear leg. There is usually a general weakness that may be accompanied by a decreased appetite and weight loss. The dog may no longer be interested in common daily activities because osteosarcoma can be very painful. In the most advanced stages of the disease process, if metastasis to the lungs occurs, breathing difficulty may develop. It is important to note that there are many other, less serious causes of these symptoms, and it should not be assumed that osteosarcoma is present simply because some or even all of these symptoms are present. The only way to be sure about a diagnosis of osteosarcoma is through testing, specifically with a biopsy.

DIAGNOSIS: The diagnosis is based on symptoms, the history, and results of several tests. Your veterinarian will ask you for a complete medical history of your pet, meaning asking you about the duration and extent of symptoms, any medications and their effects, and so on, and also perform thorough physical and orthopedic exams to assess the possibility of other disorders masquerading as osteosarcoma. Because other diseases can mimic osteosarcoma, several tests may be needed to reach a diagnosis. X-rays of the affected area are taken to help differentiate a primary bone tumor like osteosarcoma from other diseases of the bone. X-rays or a CT scan of the lungs, palpation (feeling with the fingertips) of lymph nodes, and even sophisticated tests such as nuclear scintigraphy (bone scan) can help to determine if the tumor has spread or metastasized. Routine blood tests such as a complete blood cell count (CBC) and biochemistry profile and a urinalysis are performed to assess the overall health of your pet and to help determine whether unrelated health concerns (which might affect a pet's suitability for treatment) are present. There is no blood test that confirms osteosarcoma specifically. A biopsy of the affected bone, which is a sample of bone taken while the

patient is under general anesthesia, is the definitive test for osteosarcoma.

LIVING WITH THE DIAGNOSIS

Osteosarcoma is a malignant, incurable cancer. Therefore, when osteosarcoma is confirmed, many difficult questions are raised regarding quality of life and life expectancy. Once an animal has osteosarcoma, he/she is more likely to die of osteosarcoma than anything else. Survival times are usually on the scale of months, with greater survival times and quality of life occurring in patients who undergo treatment (see below). Occasional dogs (<1%) have had their cancer shrink and disappear spontaneously and have lived their normal lifespans despite having had a proven osteosarcoma.

Although it may be difficult, it is important to prevent your dog from participating in activities that may increase pain and discomfort, such as playing and walks, when osteosarcoma is present but has not been removed (no surgery). The bone of an osteosarcoma tumor is very brittle, and exercise in a patient with osteosarcoma increases the possibility of a bone fracture at the tumor site, also known as a *pathologic fracture*.

TREATMENT

The main concern with osteosarcoma is pain at the site of the tumor. This is why most owners of patients with osteosarcoma are faced with a decision involving one of three choices: performing surgery to remove the tumor (most commonly, amputation of the affected leg); or leaving things as they are and giving medications to alleviate pain; or humane euthanasia (humanely putting the animal to death with a lethal injection). None of these is an easy or even acceptable option. For example, even with medication to help control pain, an animal with osteosarcoma may not be completely pain free if the tumor is not removed. However, the choice of doing nothing and letting the disease take its natural course is likely to be a painful and slowly life-threatening one. It is useful to remember that surgery such as amputation, as difficult as it may sound, is generally an enormous relief to patients with osteosarcoma. The pain of this tumor often has made them unable to use the affected leg properly anyway, such that they have already been walking on only three legs and surgically removing the leg (amputation) simply removes the source of pain. Dogs and cats manage extremely well on three legs; the only common exception is if they have very severe arthritis or other reasons for pain or weakness on the three legs.

Several types of treatment are available. Your veterinarian will discuss the most appropriate options for your dog and together a decision can be reached. Not all treatment options are recommended for all dogs with osteosarcoma. *Pain medication* (e.g., nonsteroidal antiinflammatory drugs and opioids) can be given as a form of palliative pain control. *Radiation therapy* may improve the quality of life and slow down the progression of the tumor but will not reverse it. Surgery is the most widely used and recommended option. Removal of the tumor through *amputation* of the affected limb is most commonly performed. Alternatively, a *limb-sparing procedure* may be performed in which only the affected part of the bone is removed and replaced with transplanted bone from a bone bank. If your dog is a candidate for this limb-sparing procedure, your veterinarian will recommend a veterinary surgical specialist because only a few veterinary centers around the world perform

this type of procedure. Surgery is most effective when combined with *chemotherapy* to control microscopic spread to other organs (metastatic disease). Chemotherapy does not offer much benefit unless surgery or radiation therapy is also performed. Chemotherapy is given as periodic (weekly or every 3 weeks) injections. It does not cause a pet's hair to fall out like it does in people, and although side effects are possible with any drug including chemotherapy drugs, these occur only in a minority of cases. The goal of chemotherapy is to slow the progression of the tumor and its spread; only very rarely does chemotherapy (even if combined with radiation therapy and/or surgery) eliminate osteosarcoma altogether.

It is very difficult to predict the exact survival time of a dog with osteosarcoma because there is wide variation. Many factors must be considered including the general health of the dog before the diagnosis, metastasis of the disease to other parts of the body, the response to treatment, and expected natural lifespan.

DOs

Before the Diagnosis:

- Do seek a second opinion if the diagnosis is unproven. Osteosarcoma cannot be diagnosed without a biopsy. Your veterinarian can refer you to a veterinary oncologist. These cancer specialists are known as Diplomates of the American (or European) College of Veterinary Internal Medicine, Specialty of Oncology (directories: www.acvim.org and www.ecvim-ca.org).

After the Diagnosis:

- Try to keep your pet as comfortable as possible; osteosarcoma can be a very painful condition.
- If you are having difficulty accepting that amputation might be the best (or at least the "least bad") option, realize that the result of amputation is the elimination of chronic, ongoing pain and that the use of a leg with osteosarcoma is already compromised or lost even before amputation.
- Similarly, understand that over the long term, amputation often seems more disturbing to us than to the animals themselves and that virtually all dogs and cats circulate perfectly well on three legs.
- Inform your veterinarian if your pet has ever been diagnosed with a medical condition and is taking medication, as this may affect which other medications can be given.
- Give medication exactly as directed by your veterinarian, and if you are concerned about possible negative effects, discuss them with your veterinarian immediately rather than simply discontinuing the treatment.

DON'Ts

Before the Diagnosis:

- Do not delay seeking veterinary attention if your dog is limping/favoring a leg and has localized swelling in a limb, even if pain is not apparent. Osteosarcoma is one possible cause, and it should be investigated.
- Do not force your dog to exercise if he or she appears painful and is reluctant to do so.

After the Diagnosis:

- Do not give medications intended for humans because some of these drugs may not be appropriate and may even interfere with some treatments or cause potentially severe adverse effects.

WHEN TO CALL YOUR VETERINARIAN

- If you cannot keep a scheduled appointment.
- If you are unable to give medication as directed.

SIGNS TO WATCH FOR

- General signs of illness: lethargy, weakness, decreased appetite, aggressiveness, and other behavior changes.
- Signs of osteosarcoma: lameness, swelling and pain in a limb, and respiratory difficulty.

ROUTINE FOLLOW-UP

- Follow-up visits will be scheduled to assess your dog's response to treatment and to closely monitor for potential complications.

Practice Stamp or Name & Address