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Osteosarcoma

Issue Description

Osteosarcoma is the most common primary bone tumor in dogs and cats. Approximately 80-85% of all canine skeletal tumors are diagnosed as osteosarcomas.

Other Names

Canine Osteosarcoma, OSA

Risk Factors

Osteosarcoma is the most common bone tumor in dogs and typically afflicts middle-age large and giant breed dogs such as Irish Wolfhounds, Greyhounds, German Shepherds, Rottweilers, Doberman Pinschers and Great Danes. It has a ten times greater incidence in dogs than humans. A hereditary base has been shown in St. Bernard dogs. Spayed/neutered dogs have twice the risk of intact ones to develop osteosarcoma. Infestation with the parasite *Spirocerca lupi* can cause osteosarcoma of the esophagus.[]

Symptoms

Osteosarcoma develops deep within the bone and becomes progressively more painful as it grows outward and the bone is destroyed from the inside out. The lameness goes from intermittent to constant over 1-3 months. Obvious swelling becomes evident as the tumor grows and normal bone is replaced by tumorous bone.

Tumorous bone is not as strong as normal bone and can break with minor injury. This type of broken bone is called a "pathologic fracture" and may be the finding that confirms the diagnosis of bone tumor. Pathologic fractures will not heal and there is no point in putting on casts or attempting surgical stabilization.

Diagnosis

One of the first steps in evaluating a persistent lameness is x-rays. Bone tumors are tender so it is usually clear what part of the limb should be radiographed. The osteosarcoma is creates some characteristic findings:

- The "lytic lesion" – looks like an area of bone has been eaten away.
- The "sunburst" pattern – shows as a corona effect as the tumor grows outward and pushes the more normal outer bone up and away.
- A pathologic fracture may be seen through the abnormal bone.
- Osteosarcoma does not cross the joint space to affect other bones comprising the joint.

In most cases, radiography is all that is needed to make the diagnosis but sometimes there are ambiguities.

A tiny section of bone can be removed for laboratory analysis. This type of analysis is considered to be absolute proof of diagnosis. The procedure is associated with some pain and our local oncologists have suggested that biopsy is not needed if the radiographs show an obvious bone tumor. If there is any question about the lesion on the radiographs, a bone biopsy should provide clear results.

Sometimes a bone tumor is surrounded by an area of bone inflammation and it may be difficult to get a diagnostic sample and several samples must be taken. These samples are too small to cause a pathologic fracture.

Amputation of the affected bone is recommended for any tumor involving bone. When the malignant structure has been removed, it is submitted for biopsy and the diagnosis confirmed at that time. Biopsy before amputation is felt to

simply add a painful procedure to the patient and, if possible, is reserved for tissue already amputated.

Treatment

Keep in mind that dogs are usually euthanized due the pain in the affected bone. Treating the pain successfully will allow a dog to live comfortably.

Amputation Of The Limb

Removal of the affected limb resolves the pain in 100% of cases. Unfortunately, many people are reluctant to have this procedure performed due to misconceptions.

- While losing a leg is very handicapping to a human (who only has two legs total), losing one leg out of four does not restrict a dog's activity level. Running and playing are not inhibited by amputation (after the surgical recovery period is over).
- While losing a limb is disfiguring to a human and has social ramifications, dogs really are not so self-conscious about their image. The dog will not feel disfigured by the surgery; it is his or her owner that will need to adjust to the new appearance of the dog.
- Median survival time for dogs who do not receive chemotherapy for osteosarcoma is 4-5 months from the time of diagnosis regardless of whether or not they have amputation.

Limb Sparing Surgery

Limb-sparing techniques developed for humans have been adapted for dogs. To spare the limb (and thus avoid amputation), the tumorous bone is removed and either replaced by a bone graft from a bone bank or the remaining bone can be re-grown via a new technique called "bone transport osteogenesis." The joint nearest the tumor is fused (ie fixed in one position and cannot be flexed or extended.)

- Limb sparing cannot be done if more than 50% of the bone is involved by tumor or if neighboring muscle is involved.
- Limb sparing does not work well for hind legs or tumors of the humerus ("arm" bone.)
- Limb sparing works best for tumors of the distal radius ("forearm" bone).
- Complications of limb sparing can include: Bone infection, implant failure, tumor recurrence, and fracture.

Prognosis

Osteosarcoma is unfortunately a fast spreading tumor. By the time the tumor is found in the limb, it is considered to have already spread. Osteosarcoma spreads to the lung in a malignant process called "metastasis." Prognosis is substantially worse if the tumor spread is actually visible on radiographs in the chest so if chemotherapy is being contemplated, it is important to have chest radiographs taken.

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