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Hypertrophic Osteodystrophy

(a Bone Disease of Rapidly Growing Puppies)

Basics

OVERVIEW

- Disease characterized by inflammation of the metaphyseal area of bone that affects rapidly growing puppies, especially large-breed puppies
- Long bones (such as the humerus, radius, and ulna in the foreleg and the femur and tibia in the rear leg) have three sections: the end of the bone, known as the "epiphysis"; the shaft or long portion of the bone, known as the "diaphysis"; and the area that connects the end and the shaft of the bone, known as the "metaphysis"
- The metaphysis is the area where bone growth occurs in puppies; the long bones in the body grow in length at specific areas known as "growth plates"; these areas usually continue to produce bone until the bones are fully developed, at which time, no further growth is needed; the growth plates then "close" and become part of the hard bone
- Disease also known as HOD

GENETICS

- Suspect genetic basis of overreaction to immune stimulation (such as vaccination)

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs

Breed Predilections

- Large, rapidly growing breeds
- Great Dane, Weimaraner—most common
- Reported—Irish wolfhound, Saint Bernard, Kuvasz, Irish setter, Doberman pinscher, German shepherd dog, Labrador retriever, boxer, others

Mean Age and Range

- Affects puppies 3–4 months of age
- Range of onset of signs—2–8 months of age

Predominant Sex

- Males more than females

SIGNS/OBSERVED CHANGES IN THE PET

- Lameness— symmetrical, more severe in forelimbs; may be episodic; degree varies from mild to non–weight-bearing; initial episode may resolve without relapse
- Depend on severity of the episode
- Often a depressed puppy that is reluctant to move

- Lack of appetite—common
- Painful
- Growth areas of the long bones (metaphyses)—painful; warm; swollen metaphyses in the lower front leg (radius and ulna) and lower rear leg (tibia)
- Fever—as high as 41.1°C (106°F)
- Weight loss; may be severe with muscle wasting (known as "cachexia")
- Dehydration
- Diarrhea
- Debilitation
- Generalized illness—respiratory or gastrointestinal
- Thickening of the skin (known as "hyperkeratosis") of the footpads
- Decreased number of red blood cells (known as "anemia")

CAUSES

- Unknown; several theories have been considered—some have been eliminated as possible causes through research, while others may be involved with the disease, but have not been proven to cause the disease
- The following theories have been considered:
- Metabolic
  - Inadequate levels of vitamin C (known as "hypovitaminosis C")—this has been eliminated as a possible cause; disease may be a result of overuse of available Vitamin C in hyperactive bone formation
  - Low levels of copper (known as "hypocuprosis")—has been identified as a cause in rats, but not in dogs
- Nutritional
  - Providing too much food or food that has excessive levels of certain nutrients (known as "overnutrition") and/or giving too many supplements (known as "oversupplementation")—overnutrition and oversupplementation appear to be present in some affected puppies, but not all; therefore, it may play a role in some cases
  - Incomplete occurrence in litters (that is, not all puppies in a litter may be affected)
  - Correcting diet does not always alter the course of the disease or eliminate relapses
- Infectious
  - Bacterial or fungal organisms—infection may be secondary to bone involvement and not cause of disease
  - An association with the timing of canine distemper virus vaccinations has been suggested

RISK FACTOR

- Vaccination against canine distemper virus may lead to uncontrolled inflammation in the bone-forming centers (known as the "osteogenic centers")

Treatment

HEALTH CARE

- None specific
- Supportive care—depends on severity of disease; care may range from none needed to intensive care, for severely affected puppies
- Depends on the severity of the episode, fever, and the puppy's ability to maintain normal hydration and willingness to eat
- Some puppies will not stand or move—prone to develop pressure or "bed" sores; turn every 2–4 hours to prevent sores and to improve breathing
- Intravenous fluid therapy—for dehydration and then maintenance fluid needs

ACTIVITY

- Restricted—running and jumping may increase injury to the growth areas of the long bones (metaphyses) and result in further inflammation
- Confine to a small, well-padded area
- Leash-walking only (if the puppy is able to stand and walk)

DIET

- Normal, commercial puppy ration, as directed by your pet's veterinarian
- Avoid supplements

SURGERY

- None specific
- May need feeding tube to be placed surgically—in debilitated puppies that will not eat or drink and have frequently relapsing episodes of sudden (acute) clinical signs
- Deformity correction—may be needed if the bones become deformed due to disruption of normal bone growth; correction accomplished with a variety of surgical bone-cutting techniques; the bone then may be stabilized with fixation device

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Nonsteroidal anti-inflammatory drugs (NSAIDs)—to control pain and fever; may try aspirin, carprofen, firocoxib, etodolac, deracoxib, meloxicam, or tepoxalin, as directed by your pet's veterinarian
- Pain relievers (known as “analgesics”)—can be used in conjunction with anti-inflammatory medications; example, tramadol
- Prednisone—only when no response is seen to NSAIDs; may cause growth plate disturbances
- Vitamin C—may be inadvisable as it may make condition worse; may speed up abnormal calcification of affected bone and may decrease bone remodeling

Follow-Up Care

PATIENT MONITORING

- Signs of improvement—less sensitivity to the growth areas of the long bones (metaphyses); the pet gets up; appetite improves; fever resolves

POSSIBLE COMPLICATIONS

- Severe weight loss with muscle wasting (cachexia)
- Permanent bowing deformities of the limbs
- Secondary bacterial infection
- Pressure or “bed” sores
- Involuntary muscle twitching, seizures—with low levels of calcium in the blood (known as “hypocalcemia”)
- May see secondary generalized disease caused by the spread of bacteria in the blood (known as “septicemia”)
- Recurrence of clinical signs
- Death

EXPECTED COURSE AND PROGNOSIS

- Course—days to weeks
- Most affected pets—one or two episodes and recover
- Some affected pets—have relapsing episodes of pain and fever that do not respond to treatment; rarely die or are euthanized
- Prognosis—usually good; guarded with multiple relapses or complicating secondary problems
- Persistent bowing deformity of the limbs—eliminates many purebred puppies from the show ring

Key Points

- Disease characterized by inflammation of the metaphyseal area of the bone that affects rapidly growing puppies, especially large-breed puppies
- Lameness—symmetrical, more severe in forelimbs; may be episodic; degree varies from mild to non–weight-bearing
- Disease tends to relapse
- Bony deformities will remodel to some degree with time, but bowing of the limbs and twisting or bending of the

bones outward, away from the center of the body (known as “valgus angular deformity”), is permanent

- The more severe the disease, the more severe the bowing deformity

Notes

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