Proceedings Manual

Postpartum Problems in the Bitch: Dr. Kirk Esmond

Eclampsia

Eclampsia or puerperal tetany is a result of low concentrations of calcium in the body. This should not be confused with preeclampsia in women, a syndrome of high blood pressure and protein loss that occurs during late pregnancy. In dogs, this is usually noted during the first 4 weeks (at peak lactation) postpartum, but can occur in the last few weeks of gestation. Eclampsia can be life-threatening and is predisposed by improper prenatal nutrition, inappropriate calcium supplementation, and heavy lactation demands. This is most common in small breed dogs nursing large litters, and is more likely if the ratio of body weight to litter size is small. Excessive prenatal calcium supplementation can interfere with the physiologic mechanisms to mobilize adequate calcium stores and utilize dietary calcium sources. It is best to feed a balanced growth or puppy formula commercial diet without additional vitamins or mineral supplementation during the second half of gestation and throughout lactation. Supplementation with cottage cheese or other dairy products should be avoided as it may disrupt normal calcium-phosphorus-magnesium balance in the diet.

Although the onset of clinical signs of eclampsia is most common at peak lactation, hypocalcaemia may develop during late pregnancy or at whelping. Initial clinical symptoms may include behavioral changes, salivation, stiffness or limb pain, ataxia, hyperthermia, and rapid heart rate. Bitches may be neglectful of the puppies, restless, or exhibit scratching at the face. This may be followed by a wobbly gait, dilated pupils, disorientation, and tremors. Symptoms may progress to the development of tonic-clonic muscle contractions or seizures.

Immediate medical intervention should be instituted with slow intravenous infusion of 10% calcium gluconate given to effect. Close cardiac monitoring (by use of electrocardiogram) for bradycardia (slowing of the heart rate) and arrhythmias (abnormal heart rhythm) is required. Uncontrolled seizures may lead to cerebral (brain) edema. Barbiturates or diazepam (1 to 5mg intravenously) may be indicated. Mannitol may be indicated for cerebral inflammation and 27 swelling. Corticosteroids are undesirable because they may further decrease calcium levels. Blood glucose levels should be monitored and treated if they fall. Hyperthermia from seizure activity should be treated if necessary. Once neurological signs are controlled a subcutaneous infusion of equal volumes of calcium gluconate and 0.9% saline solution is given repeatedly every 6 to 8 hours until the dam is stable enough to take oral supplementation.

It may be beneficial to remove the puppies from the bitch for 12 to 24 hours. If response to therapy is prompt, nursing may be gradually reinstituted until the puppies can be safely weaned. If clinical signs recur once the puppies resume nursing, they must be removed and hand-fed or weaned. Eclampsia may recur at a subsequent lactation. It may be prevented by feeding a well-balanced diet during pregnancy, without calcium supplementation. In bitches with a history of recurrent eclampsia, calcium carbonate (500 to 4000 mg/dam/day divided) may be given throughout lactation. Each 500 mg calcium carbonate tablet (TUMS, regular strength) supplies 200mg of calcium. It is better to wait to supplement

calcium orally until at or after whelping, rather than during pregnancy as over supplementation during pregnancy may result in uterine inertia (failure of the uterine muscle to contract adequately during labor).

Postpartum Behavior

Dog owners often seek professional advice concerning what is normal behavior for bitches after whelping and for the treatment of abnormal or undesirable aspects of maternal behavior. Maternal behavior is so important for the survival of offspring that evolutionary forces have programmed the brain circuitry to aid with puppy survival. Due to our involvement during delivery, cleaning and resuscitation of newborns, supplemental bottle or tube feeding, and assistance in weaning onto solid food, we have likely facilitated survival and reproduction of some mothers with defects in their maternal programming. Some dogs exhibit complete and effective maternal behavior while others would have few, if any, surviving offspring without our assistance.

With major physiologic changes occurring at the time of birth, along with the overwhelming presence of demanding puppies, it is somewhat surprising that females remain as calm as they do during this post-whelping period. It has been found that stressful physical stimuli produce a smaller adrenocortical response in lactating females. Rather than responding to threatening stimuli with excitement, the dams are induced to remain calm and continue to care for their young. In a wild setting, this may put the mother's own safety in jeopardy, but the mechanism prevents disruption of her care at this critical time.

If the dam becomes excessively nervous after whelping, this may lead to her attacking her own offspring. Killing and consuming any part of the dead newborn is considered cannibalism. This has been proven in other species to adjust the litter size in accordance with environmental or nutritional conditions (low protein diets). So as wild animals, this may be regarded as a normal aspect of maternal behavior. Cannibalism may also be considered to be related to lack of maternal experience, immaturity of the dam, illness of the newborns, or environmental disturbances. For example, a sickly puppy may harbor disease 28 organisms that could affect the remainder of the litter. Bitches may often sense physical abnormalities in the young that trigger the attack. This may include low body temperature, lack of movement, or some other reason not obvious to us. Her rejection may include cannibalizing the young, shoving it out of the whelping box, burying it, or hiding it from the remaining litter. In nature, this would minimize the attraction of predators to the other young and aids the bitch in avoiding wasting energy resources needed to care for these unhealthy puppies.

Overzealous cleaning of the newborn may lead to chewing into the abdominal cavity while she is trying to shorten the umbilical cord. Hormonal factors may incite this response as well. Placentas produce appreciable amount of progesterone during pregnancy, but this level falls abruptly at parturition with the detachment and expulsion of the placenta(s). Progesterone has a calming effect on bitches so its declining levels may precipitate irritability and aggression toward her young. Some bitches may excessively lick and carry their puppies around. Using a DAP plug-in (Dog Appeasing Pheromone) device may be helpful in calming the mother.

In rats, it has been proven that small litter size may not provide enough stimulation to the mother to maintain satisfactory maternal behavior to her young. This may apply to dogs as well in that a bitch with a singleton may not be able to leave the puppy alone so it can rest. Very large litter size may also be stressful to the dam. These bitches may seem anxious, vocalize and have difficulty settling down because they are obsessing over puppies crawling away from

The group or due to the number of puppies for which them must care. Maternal indifference may also be a result of domestication and our continued involvement in the entire whelping and raising of our puppies.

Another important concern that is believed to create aggressive behavior toward people or puppies is a low calcium level. Calcium is needed for oxytocin uptake, which is needed for normal maternal bonding and imprinting on the young. Bitches with low calcium levels will often get glassy-eyed, stare and growl at pups, try to hide in small places or closets, or be disruptive and continually move puppies around. Often these bitches do not respond normally to their owners either. When monitoring calcium levels, one must monitor ionized calcium levels. Total calcium levels have been shown to be normal in association with calcium-responsive maternal aggression in Bull Terriers. Bitches may dramatically improve within 30 to 45 minutes of calcium administration.

Hyper excitement, failure to allow nursing, or other behavior may also be seen after Cesarean section. This may be secondary to pain response or from lack of recognition of the offspring. Maiden bitches that have never whelped before may not react positively toward their offspring when presented with their litter after surgical recovery. It may take up to 72 hours post-whelping for some bitches to exhibit normal maternal behavior. Close observation of the bitch and puppies during this time period is critical. When bitches are uncomfortable or in pain it is common to see unusual behavior. Proper nutrition, environmental conditions (temperature and quiet surroundings) and close human observation or intervention are necessary for a successful puppy raising experience. 29

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